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American
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Original Articles

THE STABILITY OF THE TREATED DENTURE

GEORGE W. GRIEVE, D.D.S., TORONTO, CANADA

THIS title has been wisely chosen, for it permits sufficient latitude to cover the subject in its entirety. It contains one tremendously powerful word—stability, which means fidelity and strength to stand and to resist being moved. This is a most desirable attribute, or quality, in everything on earth. The Allied Nations are fighting for this very thing in the world today. Stability in the various activities of life is not always easy of attainment, so we, as orthodontists, must carefully analyze our cases and skillfully apply treatment, based upon a sound philosophy, if we are going to succeed in establishing that stability.

Consideration of retention must enter into the resolution of all the attending problems of a case during its analysis. The attainment of stability is dependent, not only upon Nature's stimulus to growth and development, but also upon well-directed and skillful mechanical stimulation of the growth process, based, as previously stated, upon a sound philosophy, to bring the teeth and dental arches into harmony with what Dr. Edward H. Angle[1] designated *the line of occlusion*, his definition of which was "the line with which, in form and position according to type, the teeth must be in harmony if in normal occlusion." I venture to say that no student who was so fortunate as to have studied under Dr. Angle ever forgot this famous definition.

Sim Wallace's[2] theory of *the forward translation of teeth*, based on Hunter's "Description of the Growth of the Jaws," Fig. 1, which I have had the pleasure of championing for the past eighteen or more years, has now become pretty well established as a fundamental truth. The work of Dr. Charles H. Tweed[3] has added further emphasis to this hypothesis. He has also clarified Angle's *line of occlusion*, which I would suggest might now rightly be under-

Read before the New York Society of Orthodontists, Nov. 8, 1943.

stood as forming *the basis of the science of orthodontics.* Different authors, including Strang,[4] in 1924, and Angle,[5] in 1925, when he introduced his edgewise mechanism, called attention to the forward migration of teeth. It is very gratifying, now, to note the number of prominent orthodontists expressing their belief in this theory, which, I said several years ago, would some day become established as a scientific principle to guide us in the analysis and treatment of our cases.

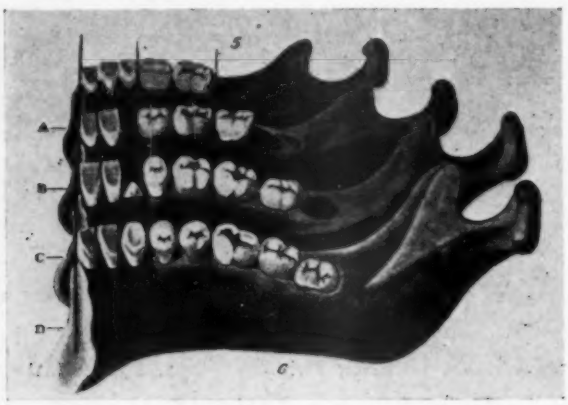

Fig. 1.

In the symposium on "The Philosophy Behind the Appliance," presented at the spring meeting of this Society, Waldron noted the natural tendency of the dentures to drift forward, and also stressed the importance of utilizing extraoral anchorage. Howes said that "certain deficiencies exist which cannot be remedied by orthodontic means," and mentioned several authors, including myself, who had discussed these conditions. I think he had not quite clearly gotten my viewpoint, nor, possibly, have many others. He said "there are types of malocclusion which, when corrected, will eventually relapse regardless of whether we use a root-moving or a less fixed type of appliance." (My comments upon this point later.) Strang said that "practically all malocclusions may be considered as complicated by *forward positioning* (italics mine) in relation to their basal bones," and where this has occurred, the teeth must be carried back. Would it not be wise to stick to Sim Wallace's terminology, *forward translation,* rather than the term *forward positioning,* so that there will not be confusion as to whether these constitute the same, or two separate theories? Strang[6] speaks of Tweed advancing *a new theory.* When we consider the length of time during which the practice of orthodontics has been on a more or less scientific basis, the theory of forward translation is not *new,* but quite *old,* as set forth earlier. Strang also stresses the importance of intruding the canine teeth, so as to get rid of interference of these teeth during the excursions of the mandible, nor has he forgotten to mention another disturbing factor of the stability of the treated denture—excessive overbite. There is much in Strang's paper with which I am pleased to concur.

All the papers in this symposium show careful preparation, and are well illustrated.

One of the outstanding factors discussed in the papers composing this symposium, that of forward translation of teeth, seems to have been responsible for the invitation I have received to continue the discussion, as you all know that this has been the chief theme in all of my papers for eighteen to twenty years.

If our philosophy concerning the phenomenon of malocclusion is correct, and treatment is skillfully carried out, the problem of retention is a very minor one. The real problem, as I have stated in former papers, is anchorage. In many cases we must resort to extraoral assistance because the chief work to be done is that of carrying teeth back, often mandibular as well as maxillary, which have been driven forward of their normal relation to the bones in which they are placed. Even the basal bones themselves are sometimes out of harmony with the cranium.

Notwithstanding the opinions of Hellman and Brodie, increase in the *length* of the maxilla and mandible *can* be brought about by proper mechanical stimulation. I feel that I have demonstrated this on several occasions and today will offer further evidence. Where there is an increase in the size of the bony bases, beyond what would be in harmony with the rest of the face and head, there is little that can be done without the aid of surgery.

Fig. 2.

More or less excessive overbite is an almost constant comcomitant problem associated with malocclusion. A normal overbite, according to research done by Orton and Lischer[7] at the University of California, is approximately 1.5 mm., and does not exceed 2 mm. There are still differences of opinion concerning the procedure in treatment of excessive overbite. Some believe the posterior teeth should be extruded; others, that the anteriors should be intruded; and still others that, in some cases, there should be a combination of both. I have discussed this subject in former papers, and, notwithstanding the fact that there are some instances where the profile would be improved by extruding the posterior teeth, I am of the opinion that intrusion of the anteriors, as shown in superimposed films, Fig. 2, before and after treatment, is the proper procedure. It is possible to increase the vertical height of the face by extruding the

posterior teeth, but I am convinced that such increase would only be temporary, as the teeth would finally settle down to the original position.

Another important factor is that teeth, ordinarily, do not occupy positions distal to normal in the bone in which they are located, so we must not carry teeth forward in the mandible in our treatment of Class II cases, nor in any other type of case, for that matter. The distinguishing characteristic of a true Class II case is a short mandible, but the teeth are *not* distal to normal in relation to the base. Beware, particularly then, in your treatment of a Class II, subdivision case (so-called unilateral distoclusion). Fig. 3 shows labial and buccal views of such a displacement, and Fig. 4 the occlusal aspect. You will note that if there is any forward translation of the maxillary teeth, in this case, it is equal on both sides; but in the mandibular arch there is a definite forward drift on the left side, and the median line cuts through the left central incisor. The teeth on the more distal side, in these cases, are not too far back in the bone itself; they may even be too far forward. It is the teeth on the more forward side which are most at fault; they must be carried back.

It is very gratifying for me to learn that Tweed's opinion, on many points, coincides with that which I have been expressing for many years. He is a strong advocate of carrying teeth back definitely, and has gone so far as to say he believes "there is little likelihood of setting the denture too posteriorly in relation to head structure," with which I agree, and he states his reasons for this opinion. However, I am disappointed that he has failed in his paper[3] to make some mention of the possible effect upon third molars in radical distal movement of the buccal segments. I venture to say that, in many instances, he has later found it necessary to have some of these third molars removed. For several years I sought to carry everything back, but eventually, in 1926, after studying the problem very fully with my good friends, Young and Pullen, I concluded that, in some cases at least, the better procedure would be to remove all four first premolars. The farther I have gone in carrying out this procedure in treatment, the more convinced I have become that it is wise in a large percentage of cases. Tweed has said that he has first premolars removed in some cases; in what percentage, I would be interested to know.

Maxillary third molars rarely become impacted, but mandibular ones are very susceptible and are liable to upset the stability of an otherwise normal denture. Even where first premolars have been removed, third molars, occasionally, will not straighten up. Fig. 5 shows radiographs of such impactions, before and after being brought up into normal positions. It is usually necessary to uncover a tooth, the eruption of which must be assisted mechanically. After making the necessary exposure, pack the opening with temporary stopping and allow it to remain for a few days before attempting to cement the attachment. Bring an extension of light wire from the main arch wire to hold this plug in place. Fig. 6 shows a little device for assisting the eruption of these teeth, which I have found serviceable. An ordinary U spring supplies the energy. The attachment to the tooth consists of a small filigree of fine wire which will fit down fairly snugly on the occlusal surface of the third molar.

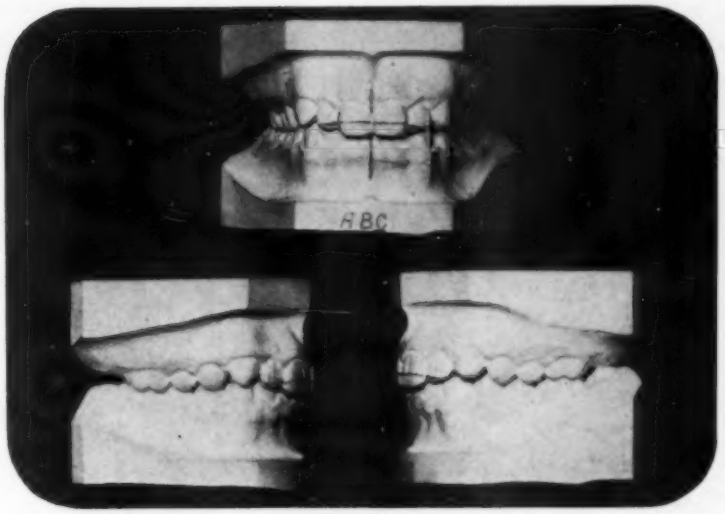

Fig. 3.

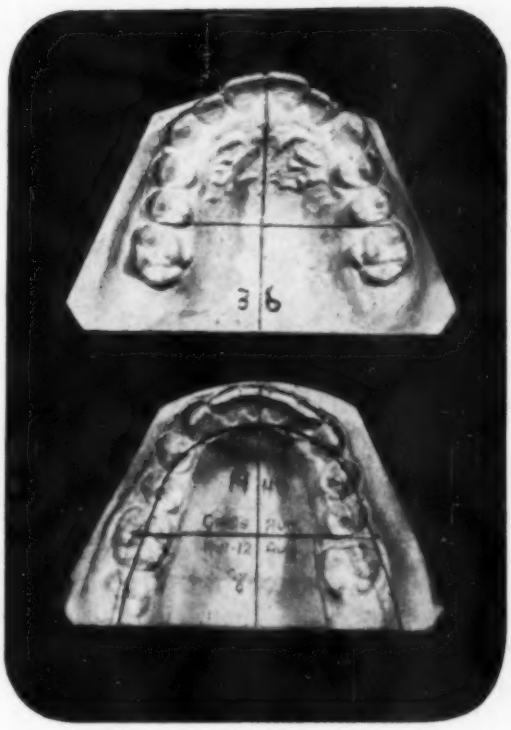

Fig. 4.

To this is soldered a round horizontal tube, with bore of about 0.025 inch, so placed that it will lie close to the distal surface of the crown of the second molar, and parallel to that surface. This filigree work is cemented to the dry exposed surface of the third molar. In one of the teeth shown in Fig. 5 the filigree work had to be fitted over the distal marginal ridge of the third molar, and was later changed for an occlusal attachment. In cementing the attachment to the third molar, coat the distal surface of the second molar with a slight film of petroleum jelly, so that the cement will not adhere to this tooth. The U spring is shaped so as to fit into the round tube on the molar attachment,

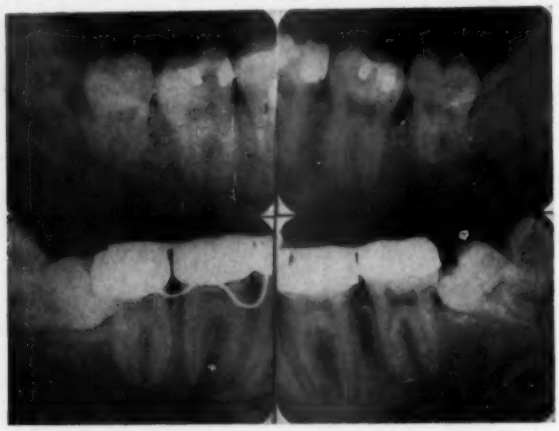

Fig. 5.

Fig. 6.

and is set with distal and occlusal action. The wire should fit loosely in the tube. It is also possible with this attachment to obtain rotation, as well as buccal and lingual movement of crown or root. If forward movement of a root, as shown in Fig. 5, is required, use an ordinary, large half-round tube, and attach a half-round pin to the spring, and shape the spring so that the pin can be placed into the tube. If it is evident that forward root movement is going to be necessary, place a half-round tube at the beginning, and use the round wire in this tube so long as distal tipping of the crown is desired. This little

auxiliary can be used with any appliance; or, if appliances have been removed, bands may be placed on first and second molars, attached together with a section of arch wire to which the spring may be soldered.

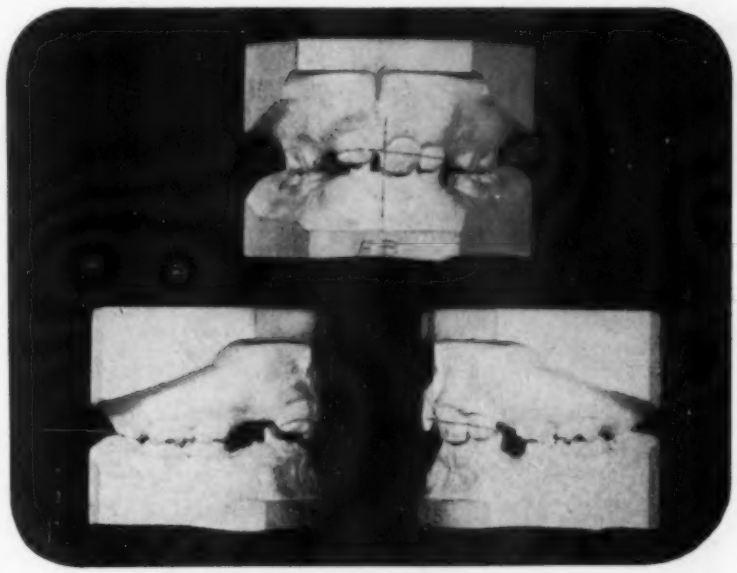

Fig. 7.

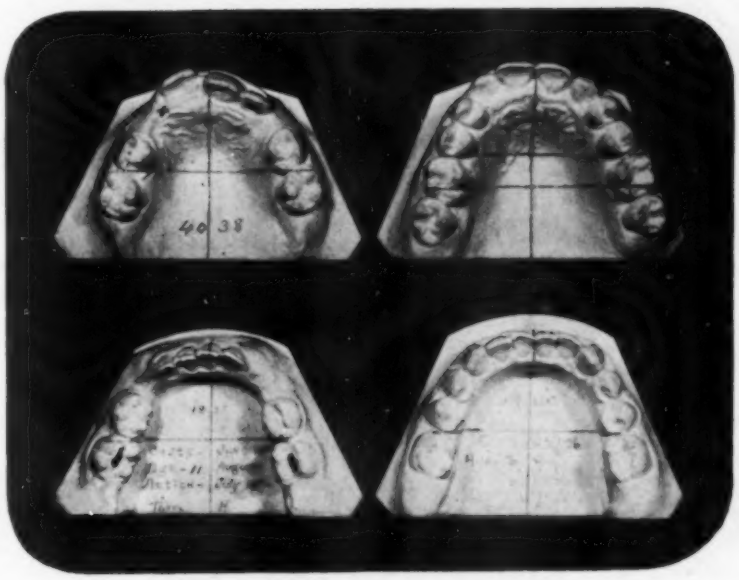

Fig. 8.

Now let us look at a marked illustration of forward translation of six-year molars and second molars of the primary set, due chiefly to premature loss of all primary first molars and canines. The boy was nearly 11 years of age when treatment was started, and Fig. 7 shows labial and buccal views of the casts at that time. As the result of an error, we have not an authentic photograph of the boy at this period. The case is a borderline one between Class I

and Class II. Fig. 8 shows occlusal view of casts. The teeth are large, the right maxillary central incisor being 0.40 inch and the left one 0.38 inch wide. The only teeth of the primary denture remaining are the second molars. The right maxillary lateral of the secondary denture is congenitally missing. The forward translation of the molars, in both arches, is great, and the median line

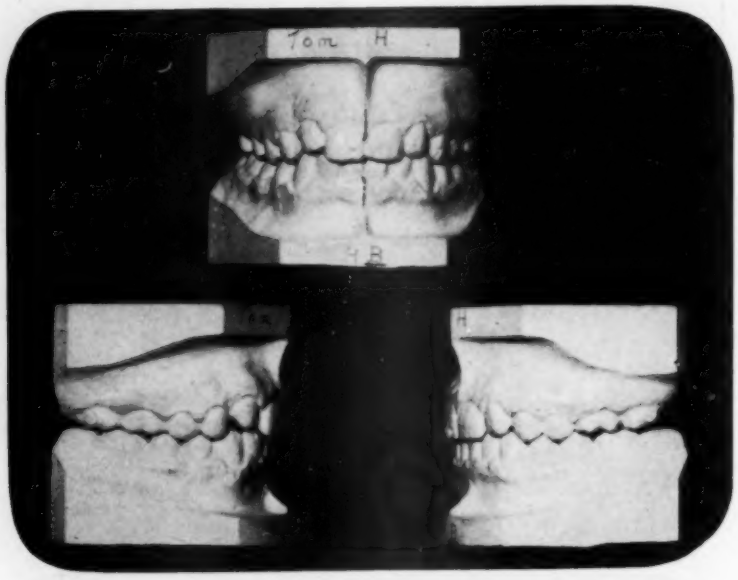

Fig. 9.

Fig. 10.

of the mandible cuts the right central about at its center. The space required for the canines and premolars is approximately 0.91 inch. The space available in the mandible on the right side is 0.83 inch, and on the left side 0.65 inch. On the left side of the maxillary arch the space available is 0.60 inch. The right lateral being absent, the space required for this tooth, the canine, and pre-

molars is 1.21 inches, and the space available is 0.91 inch. Do your own arithmetic. This case was an enigma. Radiographs showed all third molars present. The right maxillary lateral being absent, the left one was removed. The mandibular first molars carried large fillings, so these teeth were removed. Fig. 9 shows casts of the finished case and Fig. 10 the profile picture at this time. There was very little change in the profile from the original. The mandibular incisors are now sitting up nearly true on basal bone, but just crowded the tiniest bit. The mandibular appliance was removed in March, 1940, and the maxillary one in August of the same year. No retaining appliance of any kind was placed, and the case is standing up well. The profile picture after treatment shows that all teeth are still a bit too far forward.

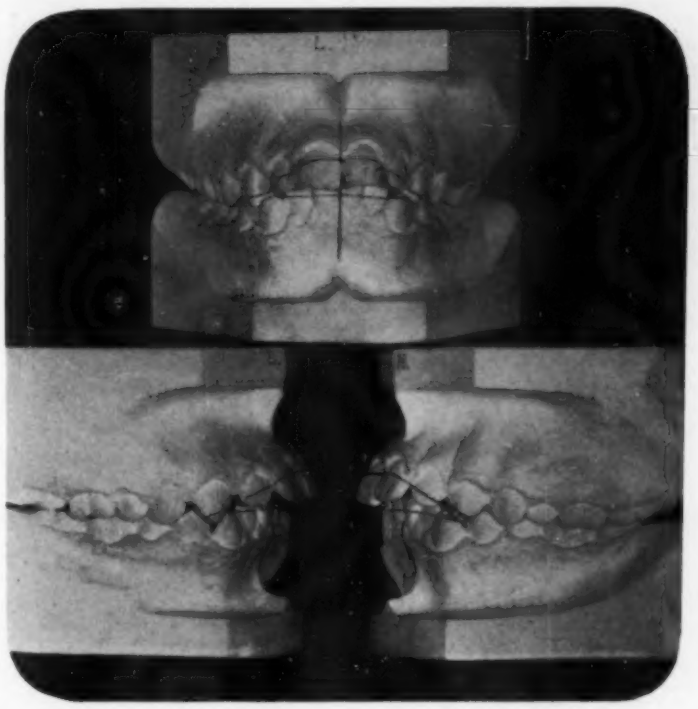

Fig. 11.

There are certain cases which we are called upon to treat in which we are very dependent upon cooperation from the patient. Fig. 11 shows casts of such a one, a carefree girl, 12 years of age. According to the cuspal relations of the buccal teeth, this case belongs to Angle's Class I; however, as the profile of the girl shows, the mandible is short, so I believe that the case belongs to Class II, Division 1. The forward translation of the teeth was great in both arches. It was decided to remove four premolars, and all anchorage possible was obtained from the posterior teeth, placing also occipital anchorage, which the girl seldom wore. Instruction was given in exercises to establish tone in the muscles of the lips, which, however, were neglected. We did the best we could, under the handicap, but the teeth were never gotten back into normal relation to the base, so it was out of the question to endeavor to obtain the required forward growth of the mandible. Consequently, we have a type of result, as shown in

Fig. 12, which seems to be legion, even today, in orthodontics—a double protrusion. The teeth are in good occlusion, but they are not back on basal bone, and the mandible has not been improved, as shown in Fig. 13. With good cooperation on the part of the patient in wearing the hood apparatus and doing the necessary exercises, a really fine result was quite possible.

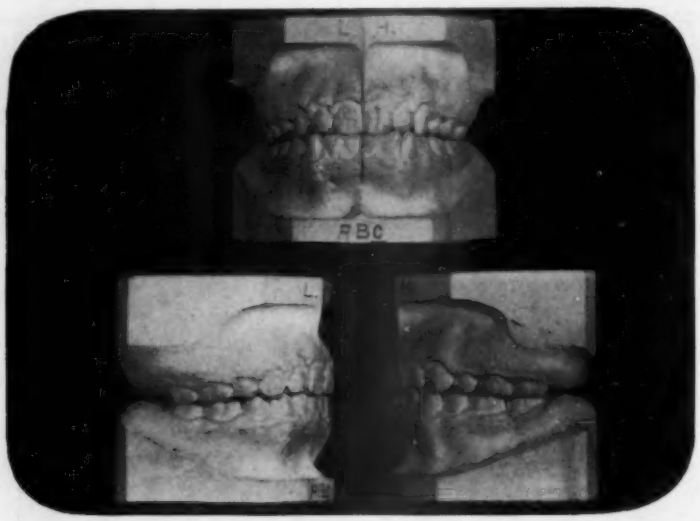

Fig. 12.

Fig. 13.

Fig. 14 shows the casts of another Class II case, a little girl, 7 years of age. There was an erupted peg supernumerary tooth between the maxillary central incisors, as well as two others, unerupted, and lying high behind the incisors. The left central incisor was badly rotated, its distal surface presenting labially. The grandfather of the child was a noted American surgeon, and he was opposed to the removal of any of the supernumerary teeth except the one which had erupted. This extraction was done, and simple appliances adjusted for a short time to widen the arches a bit and rotate the central incisor. Upon com-

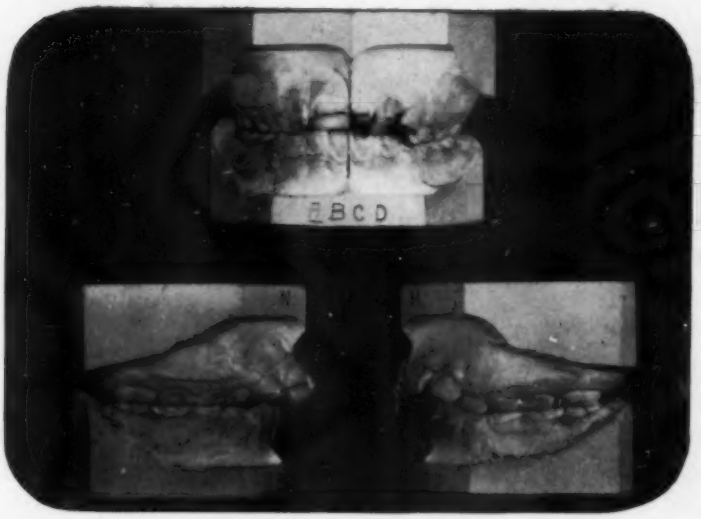

Fig. 14.

Fig. 15.

Fig. 16.

pletion of this work, the appliances were removed, and the case was allowed to rest until the girl was 12 years of age, when consent was given for the removal of the balance of the supernumerary teeth, and the case was gone on with. At that time the maxillary and mandibular incisors were definitely forward of basal bone. Where the mandible is short, and the mandibular teeth forward of normal, the latter must be gotten well back, in order to obtain the desired lengthening of the mandible, which, in the method I use, I believe takes place in the rami. In this case, to make this possibility more sure, four premolars were removed. At times, during the treatment, I was a bit worried as to whether I had erred in having any teeth removed (about the only instance in which this doubt has arisen since I first resorted to the removal of teeth in 1926). Fig. 15 shows casts of the finished case, several years after the appliances were removed. There was no retention placed except a Hawley maxillary retaining plate for a short time. You will note that the teeth are now well back, they stand true, and the overbite is normal. Fig. 16 shows profile photos of the girl at 12 years of age and at the present time. I don't think her profile has suffered from the loss of four teeth.

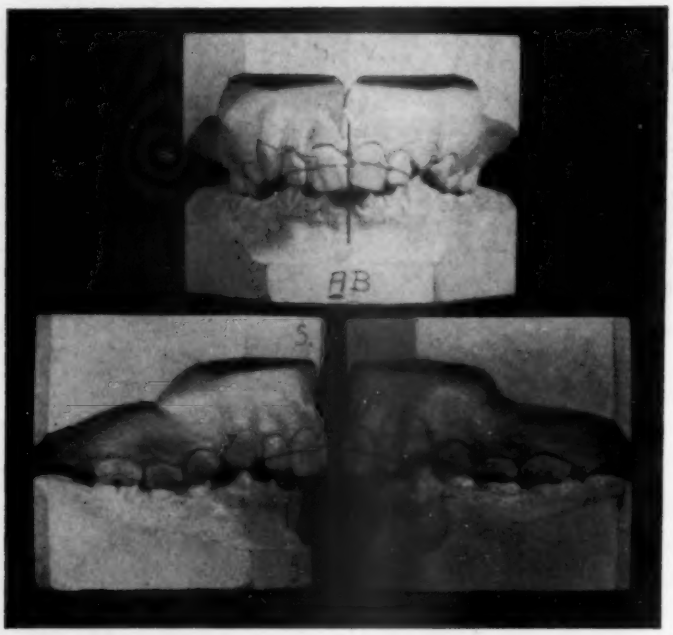

Fig. 17.

Let us now look at a somewhat similar case, Fig. 17, also belonging to Class II; a girl 10 years of age when treatment was started. The anterior teeth were all a bit forward of normal, but three second molars of the primary denture were still in place, holding a little extra space in these areas; I felt that in this case I should not sacrifice any teeth, which decision I later regretted, for I never succeeded in getting the teeth back quite as far as I believed was desirable. In a case such as this, where the mandible is definitely short, I use

the buccal planes, Fig. 18, which I developed many years ago. Before we can place these planes to jump the mandible forward, all interference which would prevent the patient from placing the mandible forward into normal axial relation with the maxilla must be removed. Three months after the planes were adjusted for this girl, an upper molar band, carrying a plane, broke; the band,

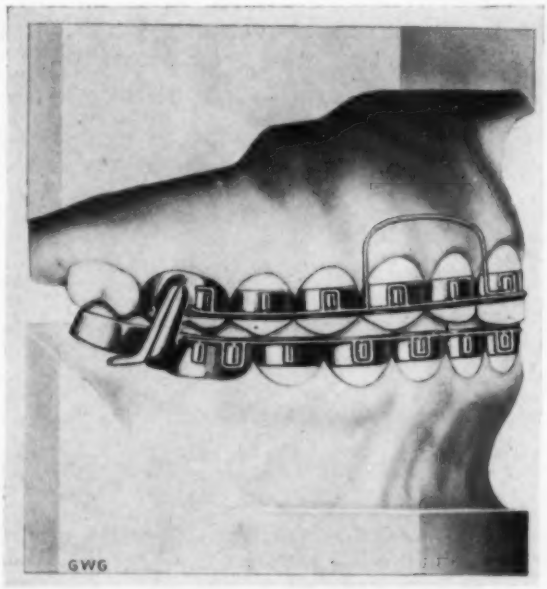

Fig. 18.

Fig. 19.

with plane, on the corresponding tooth on the opposite side of the same arch was removed to ascertain what had happened, and we found that the girl could not bite back of the normal locking of the cusps at all. In many cases I have found this same condition in six months, or thereabouts, after placing

of planes, especially in young patients. However, I am inclined to leave the planes on for about a year in most cases. Fig. 19 shows the original profile photo of this girl, as well as that of today. Her planes have now been on for about eight months, and will probably be removed in about two months' time.

Fig. 20 shows the original casts of a double protrusion case, in which we did something a little unusual. The overbite was excessive. The maxillary left central incisor was pulpless, and its root in such condition that it was deemed advisable to remove it. We decided to remove the right maxillary lateral incisor, move the left one over into the position of the left central incisor, and have a jacket crown placed upon it to match the right central incisor. From the mandibular arch we removed both second premolars, rather than the first premolars, because each carried a small occlusal filling and had slight proximal cavities. The anterior teeth in both arches were carried back to normal relation to basal bone. Fig. 21 shows the result. There is still a little more to be done. The remaining mandibular premolars must be trimmed a little to harmonize with the lesser width of the maxillary laterals, thus making it possible to tip both maxillary and mandibular incisors back a little more. There is now less fullness of the lips than existed originally. There has been no appliance on for four months, and there seems to be no unfavorable movement taking place.

It was my good fortune, a few years ago, to save from wreck a possible beautiful denture. The patient was a lady 31 years of age, who took excellent care of her teeth, who had been told by an orthodontist that nothing could be done about the malocclusion. A very expert periodontist, from whom she had sought treatment for a slight tendency to periodontoclasia, suggested that she consult me concerning the malocclusion shown in Fig. 22. You will note that the teeth on the right side are in perfect occlusion, but all the maxillary buccal teeth on the left side are entirely outside of the mandibular teeth. Both maxillary and mandibular buccal teeth on the left side were tipped, the former out and the latter in. It was a fairly simple matter to correct this, and the result of treatment is shown in Fig. 23. As she was leaving Toronto about the time I finished her treatment, in March, 1940, I placed a Hawley retaining plate in the maxillary arch. I did not see her again until February, 1941, when the casts shown in Fig. 23 were made. She reported again in October, 1942, when everything was holding beautifully. However, at this time she was still wearing the plate two nights a week, for she said that unless she did so, the maxillary central incisors had a tendency to separate just a little. The arches are wider than normal. This lady, a nurse, is one of the most appreciative patients I have ever treated.

In cases where we decide upon removal of some teeth, the first premolars are the choice, chiefly because this leaves a lesser number of teeth to carry back. However, it is not wise to extract perfectly sound teeth and leave cripples, so we occasionally find it advisable to remove molars. Fig. 24 shows casts of one of these cases, in which all six-year molars carried large fillings; so they were all removed. This complicates the treatment very markedly, and makes it compulsory to utilize occipital anchorage; it also lengthens the period of treatment. Fig. 25 shows casts upon completion in March of this year, and I feel

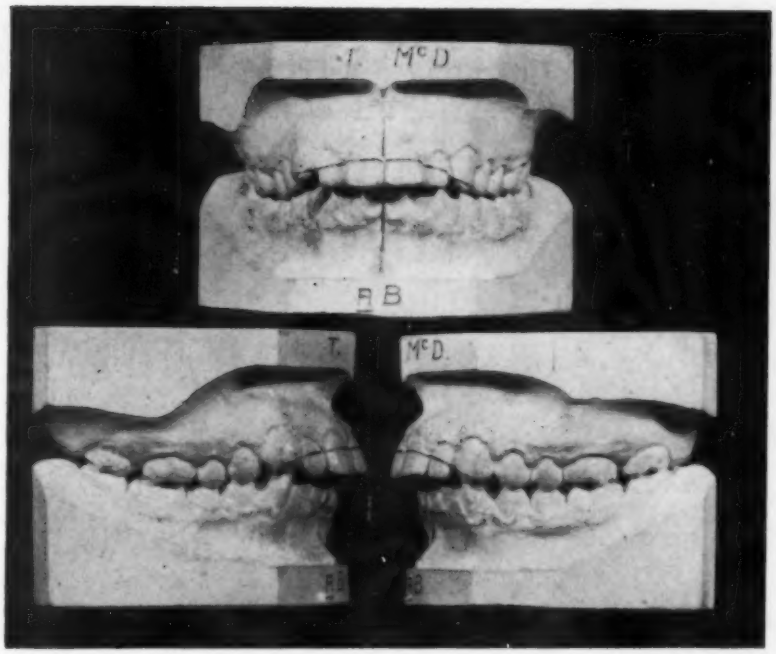

Fig. 20.

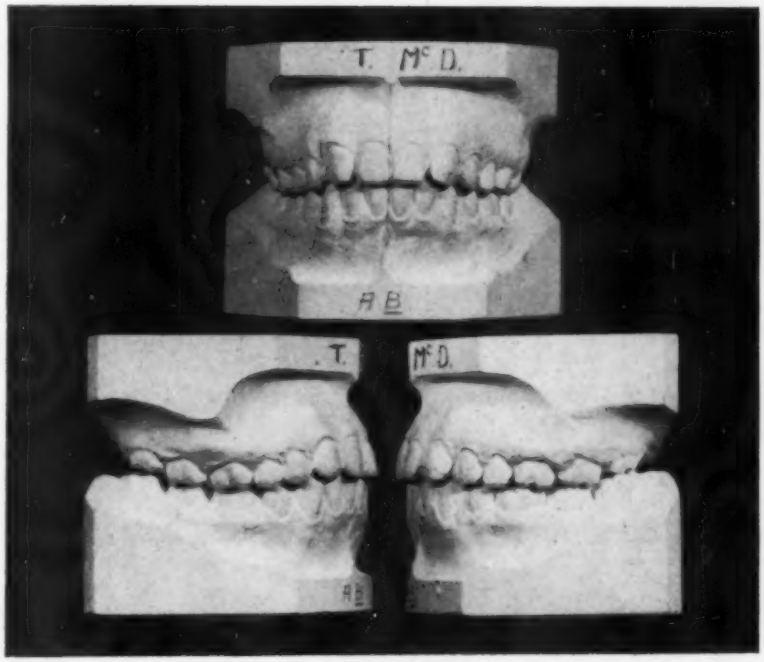

Fig. 21.

that it is a pretty creditable result. This patient, during the last few months of treatment, was living some distance from Toronto and, unfortunately, I did not get a photograph after completion of treatment. As shown by the original casts, there was a very definite alveolar protraction, coupled with a short

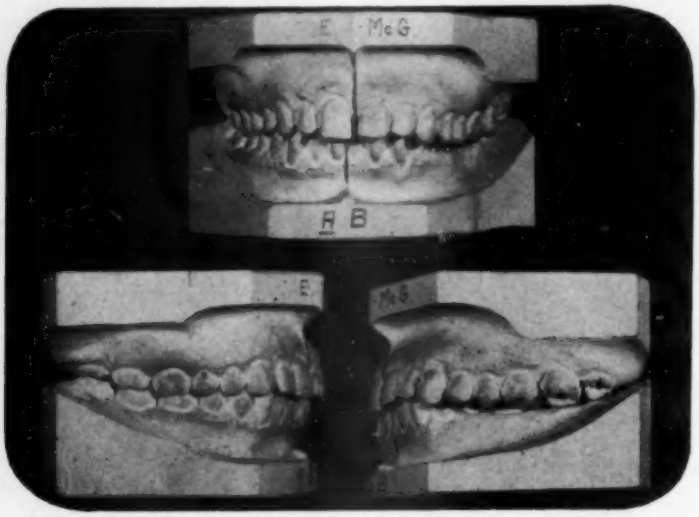

Fig. 22.

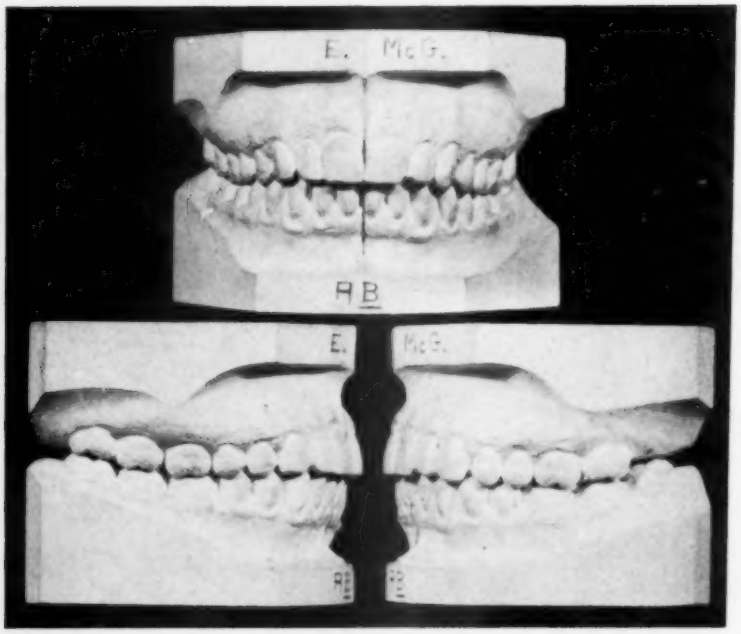

Fig. 23.

mandible. Increase in the forward growth of the mandible was brought about by means of the buccal planes (Fig. 18). The maxillary third molars were erupting when the last casts were made, but those of the mandible were not yet in sight. The only retention was a Hawley plate in the maxillary arch. The profile was very much improved.

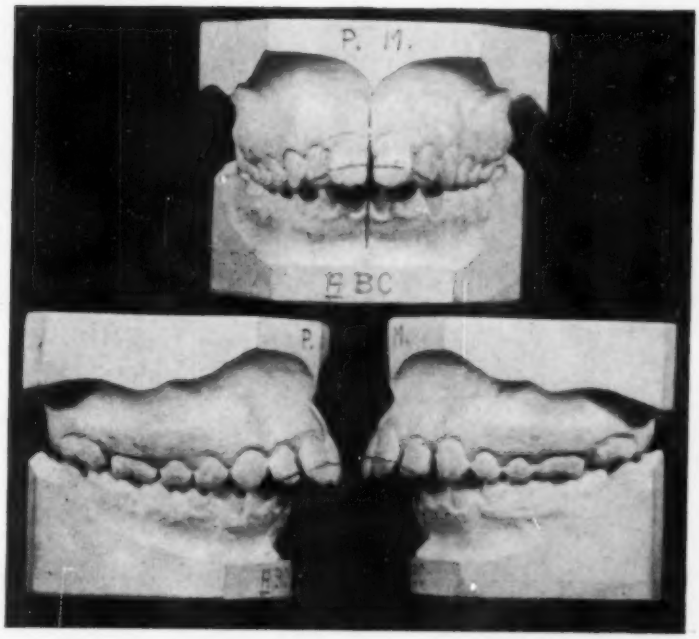

Fig. 24.

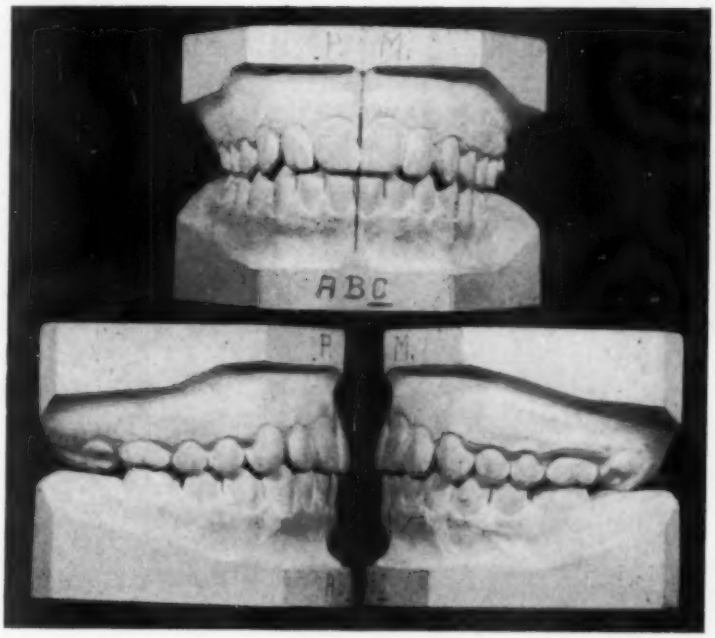

Fig. 25.

In Fig. 26 we see casts of a man 24 years of age. According to the cuspal relations this case would be classified as Class I. In my opinion there is a short mandible, so I think it belongs to Class II. The mandibular incisors are crowded and the canines are tipped forward very definitely, lapping the laterals; gum recession is starting on the buccal aspects of these canines. The patient was conscious of a weak mandible, and was very anxious to have this corrected if possible. The mandibular first premolars were removed, the canines carried back to contact with the second premolars, and their axial angle of inclination corrected. The mandibular canines and incisors were tipped lingually and intruded, to remove interference, and the buccal planes adjusted to jump the mandible forward. The planes were on for nine months. Nothing was done with the maxillary teeth except to expand the arch just a little. Fig. 27 shows the casts three months after all appliances were off, and Fig. 28 shows profile photos before and after treatment. No retaining appliance of any kind was placed. There are some very slight rotations in the incisor regions of both arches which we did not endeavor to correct fully. I feel that this case will stand up well, and the patient is very grateful.

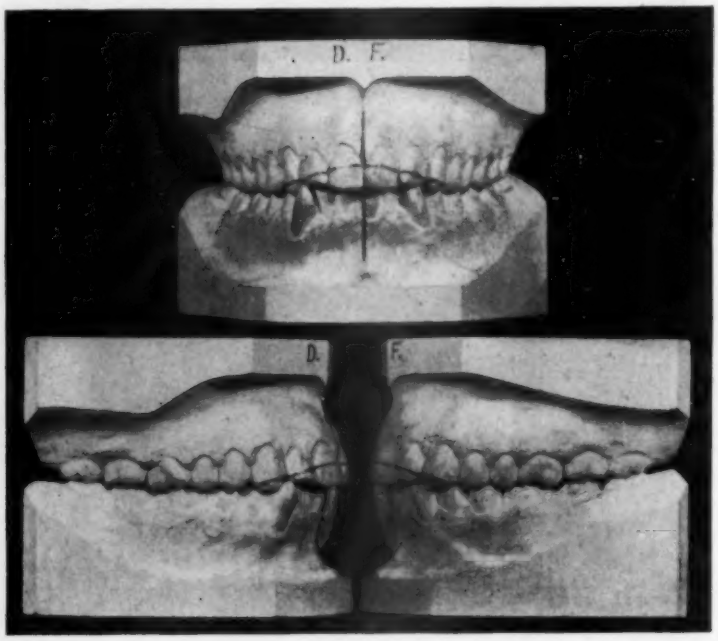

Fig. 26.

I have said very little in this paper about retention, but I have outlined the basic principles which should be our guide in order to assure stability in our treated dentures. Forward translated teeth, if not carried back into normal relation with basal bone, are at last being recognized as the wreckers of dentures, so most of us now know how to prevent treated cases from collapsing. This knowledge, if put into practice, will obviate the use of retaining appliances, to a great extent. I was not quite so tardy as many of you in realizing the importance of forward translation, and did much to get the members of the ortho-

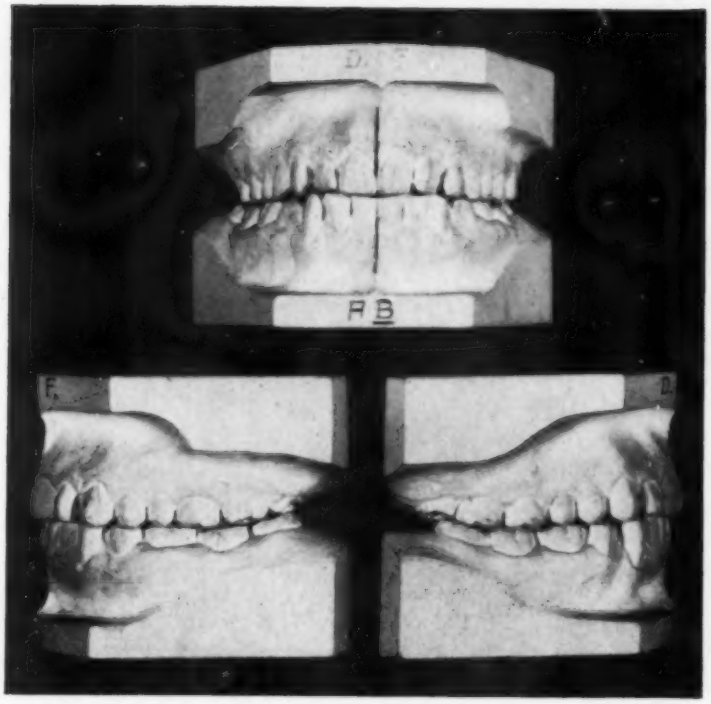

Fig. 27.

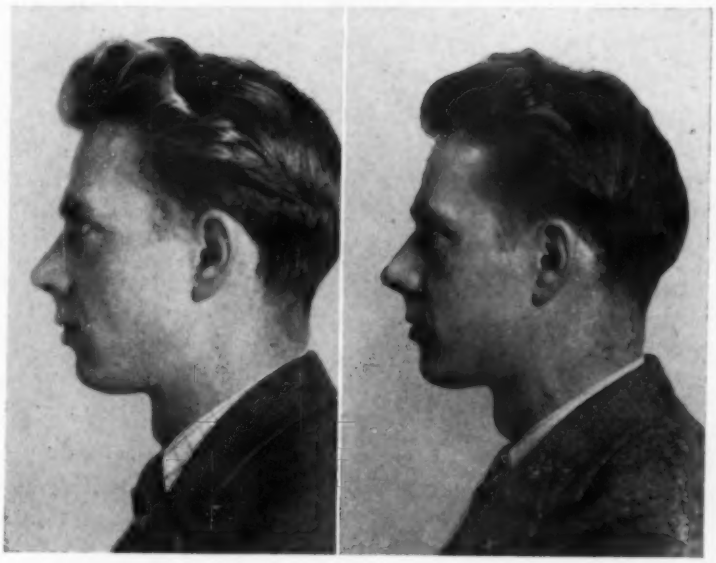

Fig. 28.

dontic profession to see it. May I quote a few lines from one of my papers[8] presented at a meeting in 1921, about the time my eyes were just opening wide enough to *begin* to see this factor: "Where all the buccal teeth, upper and lower, in adult dentures, have drifted forward, crowding the incisors, producing, more or less, what Dr. Case long ago called a double protrusion, the third molars, if present, may be removed. . . . The second molars are carried distally by means of springs, using all the other teeth as anchorage. . . . This detail is carried out with one tooth after another until all are in place."

In many instances, about this period, I tried to carry back all the teeth, and I thought for a time that I was succeeding, but soon found that my anchorage was not sufficient. In those days I do not think I was using occipital anchorage, but before very long I found that extraoral anchorage was necessary in a large percentage of cases.

During the year 1926, I realized fully the magnitude of this forward translation, and the necessity of getting the teeth back into normal relation with what Lundström[9] called the "apical base." It was in this year, also, that I resorted, in the first instance in my career, to the removal of some teeth, and I have no regrets for any of these extractions. In the earlier days I even straightened up third molars rather than remove any teeth. We earlier men in orthodontics worked earnestly to do what we thought was right, and in many instances we did what was wrong. We had a hard row to hoe. When I studied under Dr. Angle, in 1907, he gave us the impression that perfection had been reached in orthodontic appliances and treatment. He soon changed his mind.

The great fault, for many years, was that there were too many theories concerning the etiology of malocclusion, of which problem we knew little or nothing. Some of us, even today, are trusting too much to *growth* and *development,* concerning which, also, we still know little or nothing.

I feel that Sim Wallace's theory of forward translation has done much to clear up the problem of the etiology of malocclusion.

The other problem of growth and development, in so far as the teeth and jaws are concerned, centers around the functioning of the dental apparatus. It is quite evident that the consistency of the food we eat now is not conducive to the necessary stimulation, through mastication, to produce jaws, in the average individual, large enough to accommodate the full complement of teeth; thus the forward translation. As we have well learned during this war, it becomes necessary to "cut one's coat to the cloth."

When I had arrived at this point in the preparation of my paper, I felt that it was time to consider it finished. Upon looking up data for references cited, I came across one of my former papers,[10] which probably fits the title given me on this occasion better than the one I have labored hard to prepare. I would suggest its perusal by those interested. I would like to quote a few lines from near the end of that paper: "The credit for what we may call the *forward translation theory* of malocclusion must go to J. Sim Wallace, of London, as he propounded this theory in his 'Essay on the Irregularities of the Teeth,' published in London in 1904. May he, and many of us who hold this view, live long enough to convince the orthodontic world of the truth of this theory."

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DISCUSSION

Dr. George M. Anderson.—Dr. Grieve passed too lightly over the title which your Committee gave him as the subject for this paper, for your comprehension of what these words, "Stability of the Treated Denture," actually mean will in a large part answer your retention problem. We orthodontists, the dentist and the patient, have thought only in terms of perfection of result. If that goal is fortunately reached, no slight change in tooth relationship is to be condoned: the result is expected to remain as if carved in unchanging granite. This standard of stability in a treated denture does *not* exist in an untreated denture. In fact, we orthodontists have a practice simply because there is little stability in the natural denture; the term malocclusion being but another word for instability. Stability implies fixation, a maintenance of form. However, whether it be machine or man, function has much to do with form. There can hardly be maintenance of form without conconformity to functional needs. But, as orthodontists, we take the human part and attempt to mold it to a form or shape as we think or see fit. What we do is not always that which is needed by the patient or even proper in the light of individual requirements. It has been well shown that parts of the human anatomy which became inactive or useless are discarded or diminish to a degree equal to their very lack of use. I venture to say that we would be shocked if we could obtain figures showing the efficiency of use of many of our orthodontically perfectly treated dentures. Since there is a coordination of form and function, a lack of either bodes ill for the other, and therein lies one reason for instability.

There is nothing stable or fixed about the human masticatory field. It is always on the change; when physical processes are not doing something to it, the dentist or the patient is. From the first beginnings of the jaws and teeth, there is an upbuilding to provide for the needs of the individual; there is hope for a masticatory field esthetically and functionally sound. But throughout the years there is a change. Influences are at work to disorganize the splendid natural plan implied by the form and parts created before function. A few persons are fortunate enough to develop along lines originally implied; the teeth, the jaws, the face and head, all are satisfactory in form, esthetically and functionally sound, and coordinated into an ideal product. But others, who are in great majority, show the effect of adverse influences, and malocclusion of the teeth develops over the years, with the result that there never had been a stability worthy of the name either in the developing masticatory field or in the fully erupted denture. Retention, to me, in the light of the recognition of the preceding factors, becomes not a minor but a very serious matter and a basic part of orthodontic therapy.

Regardless of the title which your Committee gave to Dr. Grieve, I felt certain that the greater part of his paper would deal with diagnosis of malocclusion and that it would revolve around the forward translation theory. You have only to read the essayist's fine contributions during the past twenty years to know that he thinks retention is not a serious

problem if diagnosis resolves itself into an acknowledgment of forward translation of the teeth as the fundamental basis for most of present-day malocclusion. The paper you have heard is in accord with that statment. While I believe that forward translation exists to a very great extent, I do not believe that retention may be ignored in these cases. It is not enough to say that correct diagnosis will satisfy retention needs. For even though the malocclusion may be apparently satisfactorily treated, the cause or causes for the forward translation may still exist. Forward translation is primarily a symptom, not a cause. None of the contributors to this theory show clearly what the cause of forward translation is. The key ridge, the mandibular line with incisor inclination, palatal markings, all these give no explanation as to what caused the forward translation; they simply show that it exists. There appear to be at least two distinct types of forward translation and they most certainly do not appear to have the same etiology. This differentiation will help in outlining therapy which includes retention. There is the type which is a forward translation of all the teeth, and in which, if anything, there is an overabundance of bone area in which to realign the teeth. There is no lack of posterior or occipital growth. These are the single or double protrusion types. The other is the type in which there is a lack of posterior or occipital growth. The face does not seem to emerge from beneath the cranium. Still, the teeth, in number and size, are present and will attempt through eruption to give some sort of occlusal relation. Since posterior growth is so lacking, the result appears to be a forward translation of the teeth in relation to available bone area. The picture is not too clear as to just what does happen, but that is in keeping with most of our etiological knowledge. I am sure that a great many cases of malocclusion have been improved in my office without my without my ever having the slightest idea of what the cause or causes may have been, and that they have stayed only because retention by mechanical means was insisted upon. Lest anyone in this audience think that I may not have a clear idea of what forward translation means, and that some of these cases were actually forward translation unrecognized by me, I shall quote from an article which I wrote over ten years ago: "There are very few true distoclusions; most of these are, in actuality, a forward movement of the maxillary teeth giving an impression of distoclusion of the mandibular teeth when, as a matter of fact, no such thing exists, and, if the case is treated on such a premise, only failure can result." While I do have a very great appreciation of forward translation as an important phase of orthodontic diagnosis, I am not convinced that it is even remotely the whole or major part of the solution to stability of the treated denture. Therefore, I shall still admire the qualities of retaining appliances, among which is the oft lost, many times broken, and sometimes worn, so-called Hawley retainer. For that matter, Dr. Grieve also uses a Hawley retainer once in a while.

I hope the profession will not be carried away by a lot of false hopes that forward translation provides another "sure-fire" remedy for orthodontic ills. There is a lot of evidence that a tremendous wave of enthusiasm is being created, about which we may have some regrets. Anyone of reasonable experience in this audience can recall other flashes of great brilliance which, when subjected to the test of time, were found to be useful, but, in the main, were but another road out of the wilderness of malocclusion and its treatment. Please do not misunderstand. Dr. Grieve and others, who have our respect for their thoroughness, sincerity, great technical skill, and keen observation, have made with increasing argument a substantial literary effort to convince the orthodontist that treatment will be proportionately successful to etiological and diagnostic comprehension, further aided by sound and reasonable mechanical aids. This is a logical approach in keeping with sound medical therapy. However, the great tendency is for the less experienced or the neophyte to accept the enthusiasms of the essayist or clinician without too careful or extensive analysis; and the essayist, without meaning to, is apt to overpersuade himself and his fellows that his is the only road. Evidence of this tendency is found in our recent literature, to quote: "This mechanism is the only device that can be depended upon to perform tooth movement successfully, whereby the philosophy of his treatment is brought to fruition."

There is one final point I should like to mention regarding stability of the denture and the attempt to lessen defects by overcoming forward translation. There is a very broad hint in the general acceptance of forward translation that early treatment of malocclusion

may be contraindicated. Otherwise, how can you avoid trouble with unerupted second molars? Dr. Grieve mentioned the probability of third molar trouble. Distal movement of teeth with lack of growth occipitally is very apt to displace or interfere with second molars according to the average age of today's orthodontic patient. As a matter of fact, only this past week I have had evidence that I have buccally displaced erupting maxillary second molars in two patients. This would seem to indicate that I should have delayed starting treatment until all the teeth, with exception of the third molar, were erupted, or that I should have had certain teeth extracted as a part of my plan to overcome forward translation. I had no idea that growth would fail me so miserably. I began these cases early so as to add mechanical stimulus to natural growth. I had plenty of justification, for not so long ago this was the backbone of our treatment. Ideas and papers on the subject filled our journals. Should I have waited to find out what growth would occur posteriorly and to know before I started treatment just what space for the molars would be available? If so, that means an older group of patients. There seems to be a collision of thought concerning the forward translation theory and the much discussed biologic or growth and development theory, resulting in a rather argumentative approach to the treatment age.

In closing, I shall ask Dr. Grieve the following questions which refer to, and have been evolved from, his paper. They have been submitted to Dr. Grieve so as to permit a more fully thought out answer:

1. In what manner do you determine the extent of basal bone, and, if you are dealing with a 10- to 12-year-old child, how can you satisfy yourself that a limit of basal bone development has been naturally reached and that no more will occur? For, if you extract to bring tooth quantity within the bone limits existing at the age of 10 to 12 years, might development not have continued, obviating extracting? In other words, should not treatment be started very much later than is now generally accepted, or when bone growth limits have been more fully established?

2. You state that our chief job is to carry teeth back which have been *driven forward* of their normal relations to the bones in which they are placed. What is this driving force, how does it work?

3. You state that maxillary third molars are rarely impacted but mandibular ones are very susceptible and are liable to upset the stability of an otherwise normal denture. Just how do the third molars act to upset the denture? Is it possible for pressure of two teeth to disturb the balance of fourteen teeth, especially since the fourteen are in occlusal relations with fourteen others?

4. You state that the distinguishing characteristic of Class II is a short mandible. Besides "jumping forward" the mandible with buccal planes, you mention that you then obtain a "required forward growth of the mandible" which "takes place distal to all the teeth." How do you obtain this?

5. I find it difficult to reconcile the *short* appearing mandible jumping forward to give a *full* appearing mandible. Isn't it possible that the mandible is not short if you can so readily jump it into a better appearing mandible and better tooth occluding position? You do not claim there is very much "required forward growth" of the mandible in the very short time most of your patients wear the buccal planes; it appears that your improvement, therefore, is more a complete bodily movement of the mandible. If this be true, what is the condylar situation?

Dr. Robert H. W. Strang.—In the old days of our specialty, when two men disagreed it seemed to be the end of all friendship. When Dr. Grieve first came out with his ideas on forward translation, he and I did not agree as to the method of treatment. I am, and was, and I think perhaps always will be, fundamentally, an idealist. I looked at the problem as one of getting the teeth into proper relationship to basal bone by the preservation of a full complement of dental units and I discussed that principle with Dr. Grieve for years. Dr. Grieve went ahead with the extraction. Then Dr. Tweed came along with proof that Dr. Grieve was on the right track, and I want to make acknowledgment at this time that Dr. Grieve and Dr. Tweed, to my mind, have pioneered a principle that we must accept, because of the fact that we are dealing with a condition within the organism that we cannot overcome by our mechanical treatment.

Dr. Grieve, you have won the battle, and I congratulate you, and stand here as the vanquished.

I feel that Dr. Riesner* has beautifully answered the arguments of Dr. Sved in a masterly manner, so I cannot add to his discussion. There seems to me to be one thing lacking, primarily, in Dr. Sved's paper, however, and also in Dr. Anderson's discussion of Dr. Grieve's paper: they have looked at this problem as an individual failure in growth. They have only looked at that one side of it. They have considered the alveolar process as the factor of stability, and as the only factor of stability. Gentlemen, that is only one of a number of factors which we must depend upon to hold our case after treatment is completed. The muscles, the inherent growth properties, the metabolic factors, the component forces, and axial positioning must, if we are to stimulate functional growth and obtain stability, be directed into correct lines of interplay; consequently, one of the important things to consider in this re-establishing of teeth on basal bone is the direction of functional stress, the muscle play that falls upon them, and, if we are to gain any stimulation in basal bone growth, we must have the cooperation of constitutional factors.

I think Dr. Tweed and Dr. Grieve have brought to the specialty the most hopeful theory, the most hopeful philosophy, that we have had in years. I have followed Dr. Tweed's teaching now for over two years. I know that the stability of my final results are now beyond anything that I had ever met with before. Dr. Sved said that time is the determining factor. For thirty-three years I gave Nature a chance to build upon basal bone, and practiced along ideal lines. I think that is a fairly long time to test out the theory of idealism in all cases. How much longer would you have me wait before I shift to the proposition that, if Nature has failed primarily to give us a base, treatment can produce that base, and we should still in all cases adhere to idealism? I wish I could, but I cannot.

Dr. George W. Grieve.—Dr. Anderson has presented a very fine discussion of my paper, and has brought out many points for consideration. He looks upon retention as a very serious matter, while I believe that it is not, if the teeth, in treatment, are properly placed. Many of my cases have had no retaining appliances at all and are standing up well.

The cause of forward translation is the lack of sufficient masticatory function to set up adequate stimulation of the growth process and bring about the normal amount of occipital growth of the maxillary bones. Dr. John Hunter said that the first permanent molars should never come to occupy any of the space originally occupied by the deciduous denture.

With reference to Dr. Anderson's direct questions: Some of them have already been answered by Dr. Riesner. As to the question of estimating the extent of basal bone in the 10- to 12-year-old child, we would be guided by the extent of forward translation of the teeth, if any, in the dental arches, and by a study of the profile of the child. I would not expect that the limit of growth had been attained at that age, but any interference with such growth should be removed as early as possible. The size of the teeth of the child, and the stature and type of the parentage, as well as of the child, should be considered. I believe that the ideal time to commence major treatment of the average case is when the premolars have just erupted. Of course, there are instances where some minor work should be done earlier. The treatment of a Class III malocclusion should be started as early as it is possible to handle the child.

I spoke, in my paper, of teeth having been *driven* forward. That was an ill-chosen word, but where there is insufficient space for an erupting tooth, the adjoining ones are inclined to move out of its way—in the direction of least resistance, which is seldom distally. The tongue is also a factor, particularly when the contiguous muscles are not functioning normally. Of course, the chief factor is the absence of sufficient occipital growth of the main body of the jawbones.

Regarding the unerupted third molars, I would say that, where there is insufficient space for them, they constitute "the last straw that breaks the camel's back."

How do I obtain forward growth of the mandible? Fig. 18 in my paper shows the buccal planes which initiate the stimulation to bring about the necessary growth. Detailed technique of the clinical procedure may be found in the *International Journal of Orthodontia,*

*Sved, Alexander: An Appraisal of Tweed's Basic Principles, Discussion, AM. J. ORTHODONTICS AND ORAL SURG. 30: 133, 1944.

about June, 1927. The result of such procedure may be seen in Figs. 14, 15, 16, 17, 19, 26, 27, and 28 in today's paper. I believe that the change that takes place is not a forward placement of the mandible, but actual interstitial growth in the rami. I have used this method in many cases for twenty years, and none have failed. If, in my career of over thirty-six years in orthodontic practice, I have done anything worth-while, it is the development of this technique for the treatment of Class II cases; still, I believe, only a few men use this method. Those who are not doing so are missing something worth-while. But, *do not* try to use these planes with simple appliances. If you do, you will fail, as adequate anchorage is necessary.

Strang's comments on my advocacy, commencing about twenty or more years ago, of the acceptance of Dr. J. Sim Wallace's theory of forward translation and, later, my suggestion of the necessity of resorting to extraction in some instances, as an expedient compromise, gives me great satisfaction. It has been very difficult to convince the men in our specialty that Dr. Angle's high ideal of normal occlusion is not always possible of attainment. For eighteen years I, too, was an idealist, but my many failures finally convinced me that something was wrong. It has not been a battle, Bob, nor are you the vanquished. Your acceptance of these views will do much to establish the principle as being scientifically sound.

I appreciate very much the discussion my paper has brought out, for I believe it is a good idea to allow time for this purpose. Thank you.

THE CUSPID AND ITS FUNCTION IN RETENTION

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IT IS my purpose, tonight, to offer for your consideration a very informal discussion of one of our mutual headaches. After a few years in practice we all build up an orthodontic procedure, both technical and physiological, which might be referred to as "the groove." It really becomes a groove, too: one which is hard for the older men to get out of, and one which is hard for the younger men to formulate. It is, of course, a product of our treatment experiences, and consequently, every man's groove is designed for him alone. No other orthodontist can hope to fit into it perfectly. However, all the orthodontists build grooves which correspond very closely with the others in certain general structure. In many respects, they are all very much alike.

There are some very prominent impressions in the groove which I have built for myself, and I hope that I will be able to present one of them clearly to you tonight. Retention, any experienced orthodontist will admit, is one of his really big problems. Like all the other problems we are faced with, this one cannot be answered briefly. It has a great many chapters, each of which must be given its place of relative importance. This discussion, let me emphasize, deals with only one of the chapters on retention, and it is further limited to only the functional and environmental aspects of the problem. We all fully realize that a complete, well-rounded treatment of the question of retention would include many other just as important aspects.

My subject appears to emphasize the cuspid. That was the intention, as, in my experience, the cuspid has played a vital role in retention, and it has consistently proved to be very intolerant of any failure to make provision for its principal demands.

When we accept, for a consideration, the obligation of doing our best to correct a facial anomaly, or even a simple dental malocclusion, what are our principal objectives? The first, of course, is to achieve a satisfactory result, and the second, and equally as important an objective, is to insure that our result is permanent. In fact, unless the correction stands up under the test of time, it is a failure. So our orthodontic objective, then, is to strive to obtain as perfect a correction as the circumstances will permit; and then to strive to maintain that correction, working to eliminate the factors which will be likely to undo our efforts, all the while attempting to assist those factors which will support our effort to retain the tooth and associated structures in their harmonious relationships. And right here lies the substance of the thought I present to you tonight, "Harmonious Relations of the Teeth and Their Correlated Structures." The retention problem becomes much simpler if we achieve this harmony of function by our corrective treatments. But, do we have real harmony as often as we think we do? Do we simply get a nice alignment of the incisor teeth, and maybe a classical relation of the lower first molar to the upper

first molar, but neglect to consider the interrelations of all the teeth during the act of chewing? In other words, our case is not ready for retention until *all* of the upper and lower teeth function together in the most mutually advantageous manner. Now if retention depends on good function, it would appear that the factors of retention or function should be kept in mind all during the treatment, and particularly so at the time the case is outlined and the treatment is planned. Proper retention procedure starts on the day you take your initial impression of the case. On the surface this seems to be an unnecessarily simple statement, but consider it a moment in this light. Make function the shining light of your treatment goal. Forget esthetics; if function is optimum, esthetics will have to be the best possible for that case. That is the essence of our idea of beauty: fine, healthy, efficient function. Nothing, nothing, is a better synonym for beauty than function. *Perfect function is beauty.*

If we wish to prepare the way for successful retention, we will bear in mind certain fundamental physiologic factors at the time we outline our case for treatment. We have been taught, in a general way, to predetermine our arch form by a study of the shape and size of the teeth, using as an additional guide the typal form of the head and face. Having arbitrarily chosen this artistic arch, and decided by either cranial measurements, key ridge location, or just plain guess, how the arch should be related to the cranial structure, we start tugging and pushing with our appliances. This is a good method. It often succeeds. But how would it be to start building the case on a functional foundation; building from the known and fixed mandibular quantities? By the accepted procedure, we pick our arbitrary arch form, then by main force of mechanical means try to shove the teeth into whatever alignment the diagram or chart indicates, then try to make them stay put by prolonged jail sentences, or retention appliances, as we have named them. We have tried to force the particular case into accepting a stereotyped "ideal" without, I am afraid, realizing that, in the first place, very few ideals exist, and, in the second place, forcing dental ideology on teeth will work no better than forcing social ideology upon men. The prison authorities of the nation agree that prolonged jail sentences will not rehabilitate a man guilty of an antisocial record nearly so well nor so quickly as social education. So, taking the analogy back to the teeth, let us assist the teeth out of their antifunctional position, educate them in beneficial social relations, and then see what old Dame Nature will do to help everybody concerned.

Now, it's easy to talk in parables. Explaining the practical application of the thought is much more difficult. However, to be more explicit, consider again that we are planning the treatment for a new case. Remember first that the prime requisite of your result is function—beautiful, smooth, harmonious function. Then search that case with a fine-tooth comb for any factor which would make impossible a perfect arch form, or a perfect function. For example: an undersized or oversized tooth in either jaw; the over-all disharmony of tooth sizes in opposing jaws; the size and shape of the tongue; an abnormal lip development; dyspnea; difficult swallowing; existing functional movements of the mandible; existing limitations to the mandibular movements of protrusion, retrusion, and lateral range; any developmental or functional factor which will require special attention. Instead of choosing an ideal for our case,

we should study these related factors which, because of their abnormalities, will prevent an ideal result. Then compromise the arch form and establish an optimum function for that individual. These above-mentioned factors will hinder, and possibly ruin, the function of the ideal arch. We must recognize them and make provision for them or they will trip us badly.

Then, after checking all the detailed anomalies, study the mandibular structure as a unit. The lateral dimensions of the body of the mandible will be permanently affected very little by orthodontic treatment. The mandible is composed of extremely dense bone, and it houses the tongue. In most cases, the lateral dimension of the mandible at the points of the six-year molars will be one of the most reliable areas from which to start your arch predetermination.

Fig. 1.—Diagram illustrating how the tongue completely fills the oral cavity, and acts as a positive lingual support to the teeth when the upper and lower teeth are in contact. It is also evident that this lingual support would be applied to the lower molars at all times; i.e., with the mouth open, during periods of mouth breathing, tongue biting, lip biting, etc. (Taken from Lischer.)

The body of the tongue demands a sufficient width, and the muscular structure of the area precludes the likelihood of maintaining much treatment expansion after removal of appliances. So we may consider the existing lateral dimensions of the lower first molars as a very stable quantity. A second landmark in the mandibular structure would be the lower six anteriors, provided they are present. In most of our cases the lower laterals and centrals are present and the cuspids are revealed quite clearly in our x-ray pictures. The upper teeth overlap the lowers; the upper arch contracts much more readily than the lower; the bone supporting the upper teeth is much less dense than that supporting the lowers; so, in a sense, the upper teeth are supported laterally and buccally by the lower teeth. So, by all means fashion an arch form for the lower teeth which will present the greatest possible stability and strength. Usually, the first signs of collapse occur in the region of the lower cuspids. All through treatment great care must be taken to protect this region not to overtax it. It constitutes the most important anterior bulwark for retention, but its bony support is very exacting in positional limitations, and the incisors are easily displaced to the anterior limits of the alveolus. Since these two mandibular dimensions, molar width and cuspid width, are of such an uncompromising nature, why not establish them as fixed quantities and build your arches around them? Is this not preferable to adapting them to the arbitrary form chosen from the size and

shape of the upper incisors? Using the mandibular dimensions just explained, determine the desired maxillary changes, and the approximate arch form and size. We start with our mandible and work the maxillary dimensions to it. Do not be too badly worried about the fact that we are basing our arch on the development present in a six-year old mandible, or a ten-year old mandible. If this deciduous denture is brought to optimum function, and is maintained in optimum function during the years of transitional dentition, the normal growth and development of the entire area and its associated parts will follow more nearly normal paths. Or, in other words, give Nature a chance and she will do a nice job for you. The trouble with the method I hope to condemn is that it tries to put a twenty-year-old arch in a six-year-old maxilla. Nature doesn't subscribe to the idea and will not assist you, and don't ever forget to enlist old Mother Nature's aid in your orthodontic project before you begin. So much for the mandible and treatment planning.

The orthodontic bible has been built around the inviolability of the key tooth, the six-year molar. The orthodontist looks for the intermaxillary relation of the first molars with the same degree of dependence as the mechanical engineer grabs for his slide rule. This first molar is the principal key to the development of the arches in the early years, but the cuspids come, around the tenth or eleventh year, to play an equally vital role in the permanent dentition. If any one of you were to be given your choice of keeping only eight of your teeth, you would choose the first molars and the cuspids with very little hesitation. You know without thinking that these eight teeth form the buttresses for the remainder; that with these eight, the facial form, masticatory function, and dental restorative procedures can best be maintained. We have condensed our thought and efforts around the first molars for a long time, but it appears to me that the cuspid has not received its proper amount of attention. It is one of the most important functional units aiding in retention, and we have let ourselves in for an unnecessary amount of trouble by not employing the great assistance which it can give us. I am sure that we all try to place the lower cuspid so that it will occupy a position mesial to the upper when the maxillary and the mandibular teeth are in contact. But the real need is to carry that mandible to a position (or carry the maxillary units to a position, as the case may be) so that the lower cuspid travels mesially to the upper cuspid when it is in its lateral excursion. There is the key to functional arch form. This cuspid position in a great measure determines the type of arch, square or round, that we must use, and it also affects the degree of overbite in the incisor region. The four cuspids are the teeth which, almost always, will require some shaping with the grinding wheel to facilitate this functional guide or lock. If a beneficial cuspid functional relation is not obtained, you can almost count the days which will elapse after retainers are removed before your case begins to fail. This failure will occur either in the lower cuspid-to-cuspid region from traumatic occlusion, or in the distal drift of the mandible caused by the patient's effort to evade that devastating cuspid end-to-end hammering.

To better understand the cuspid effect on masticatory function, we should investigate briefly that chief of orthodontic blessings, our old friend, the arthrodial diarthrosis. "Old man Mandibular Articulation" is indeed a friend. To review the salient anatomic facts of this joint, we remember that it is a gliding, rotating hinge, a sort of sliding universal joint, and that it guides and controls

the mandibular movements. The fossa which accepts the elongated oval head of the condyle is on the undersurface of the squamous portion of the temporal bone. It has a prominence, the eminentia articularis, at its anterior border. The shape and contour of these parts are directly related to the excursions of the teeth in mandibular function. The articular disc or cushion placed between the condyle and its fossa has the effect of dividing the joint into two parts, physically and functionally. The articular condyle slides, rotates, and has vertical travel both in conjunction with, and in apposition to, its brother on the other side. The articular eminence develops with age, as the longer cusps of the permanent teeth come into use. We know from such studies as those made years ago by Tomes and Dolamore, that no two fossas develop exactly alike, that very seldom do right and left develop alike, and that they change in old age. We know from our own experiences with the response of osseous structures to pressure stimuli and to the requirements of function, that there is a change during treatment in the forward limits of the excursion of mandible or the forward travel of the condyle in its path on the eminentia.

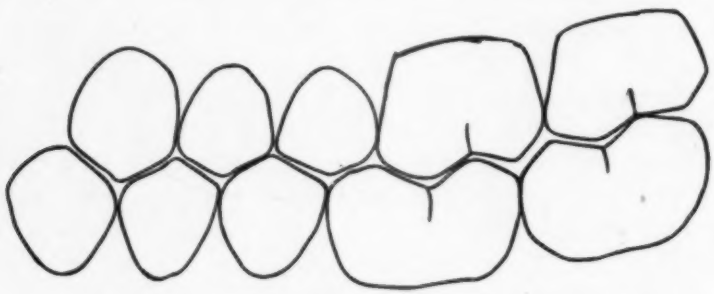

Fig. 2*A*.—As the mandible swings into lateral bite on the right side, the left condyle moves up on the eminentia articularis, and the cusps of the upper and lower teeth of the right side come into function.

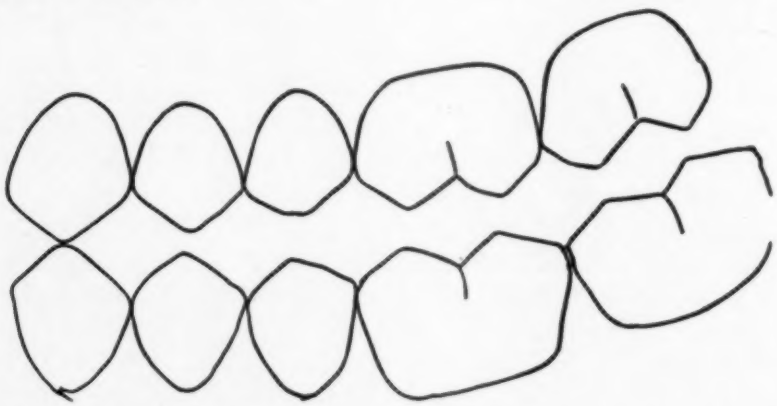

Fig. 2*B*.—Where interference or end-to-end cuspal relationship exists, the cuspid receives an overburdening load. There will result either a shifting of the cuspid position to alleviate the trauma produced, or the path of the lateral movement of the mandible will be altered to correct the interference. It is probable that the common result is a combination of both factors. Continued function in this altered mandibular path will produce compensating changes in the shape and contour of the head of the condyle and of the eminentia.

What I am driving at is this; it is my sincere opinion that within certain definite biologic limits the entire mandibular joint and its separate parts are subject to alteration under function or misfunction, and under the normal process of growth. The temporomandibular articulation has the widest range

or variety of movements of any joint in the body. It has the power, during the growing years, to adapt itself to environmental conditions within certain definite limitations. A common example is the child suffering from dyspnea. He develops the habit of mouth breathing, and drops the mandible; the cheek muscles are pulled, causing lingual pressure on the teeth and the maxillary alveolus, and gradually causing a decreased lateral dimension. This decreasing width between posterior maxillary teeth produces a compensating distal pull on the mandible in its effort to find a comfortable occluding surface. This is caused because the mandible resists the tendency to become narrower. Result: the head of the condyle seeks a more distal resting place in the fossa. As it functions in this new position, a gradual change or alteration in the structures will be brought about. Here would be an example of the alteration of the joint

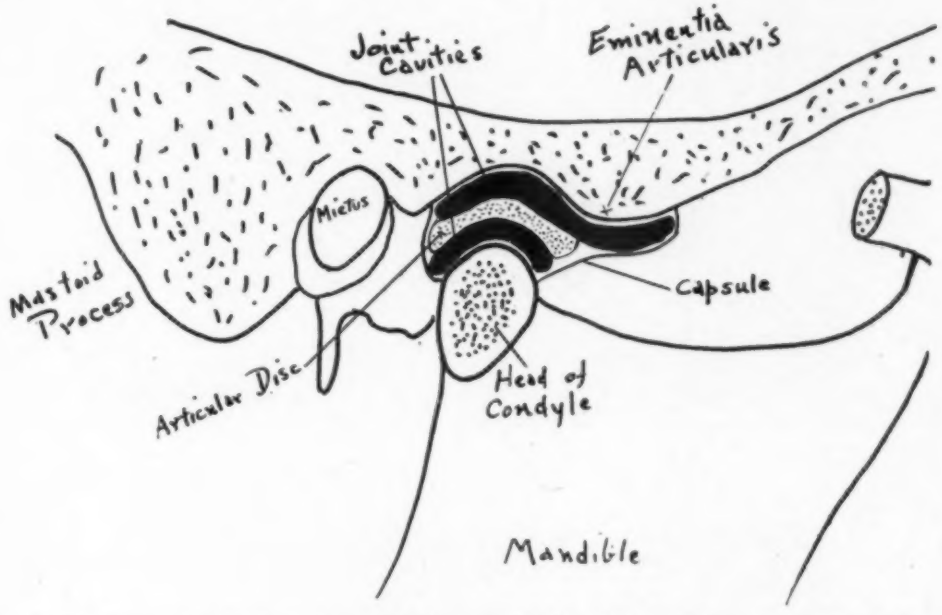

Fig. 3.—Diagram of salient features of the mandibular joint. (Taken from Cunningham's Anatomy.)

caused by environmental factors. And to see the same process of alteration take place in reverse, just remember those occasional cases we have all had where the mandible shifts forward to better intermaxillary relation immediately upon our expansion of a contracted maxilla. Without elastic bands or assistance of any other kind, the mandible seeks its optimum occluding position, and we know that the condyle head has assumed a new position dictated by environmental conditions. A second example: A twelve-year-old denture has a retarded lower second premolar. The molar drifts mesially, the cuspid and premolar shift distally, and we find the lateral excursion on that side obstructed by the upper cuspid. Here a case of total cuspid interference develops. Two things are likely to happen; first, the major portion of the function shifts to the opposite side, and second, the mandible seeks the easiest way around the obstruction on the altered side, usually to the distal. Gradually these efforts result in a completely new path of mandibular travel on that side to facilitate the re-establishing of function. The head of the condyle has established a com-

pensating change in its path over the eminentia. The surface of the eminentia accommodates itself to the change; the condyle and all the associated structures do likewise. We have have a very definite case of alteration under function. In other words, the mandible during function will search for the path presenting the fewest obstacles. It will then choose this path to the exclusion of other possible ones, and by constant use develop it into a functional habit. The continued use of this particular type of function will produce compensating changes in the glenoid fossa, the eminentia, and the condyle.

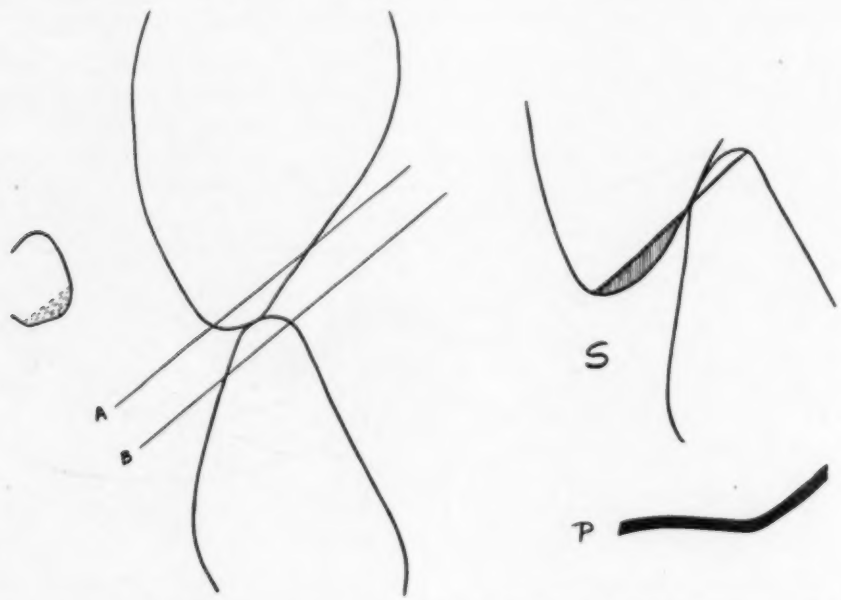

Fig. 4.—Reshaping the cuspid. The distance between lines *A* and *B* represent the amount the cuspids interfere or open the bite when in full lateral function. (Refer to view shown in Fig. 2*B*.) When in a case as the one shown in Fig. 6 where the remaining posterior teeth are in a very favorable intermaxillary relation and the cuspids still interfere in the full lateral excursion, grinding of the cuspids is indicated. Grind the mesiolingual incisal surface of the upper cuspid and the distolabial incisal surface of the lower cuspid. By this means the interference of the cuspids may be reduced effectively. *P* indicates the path of the condyle head of the opposite side in its travel over the eminentia as the teeth move into lateral function. *S* illustrates the grinding of only one of the four incisal surfaces of each cuspid.

It might serve a purpose to mention here that this alteration is not confined to the mandibular joint. It is just as certainly divided in proportional allotments to the alveolar structure, the angle of the mandible, the neck of the condyle, the muscles involved and the bones to which they are attached, the facial features, and, if you consider all the possible ramifications, the changes contribute even to the final possible effects on the personality of the child.

I have attempted to point out that the condylar path is not resistant to changes as some prosthetists have claimed it to be; that it is extremely subject to alteration in a growing child, and even subject to mild and moderate changes in adults. Now it follows that in the over-all understanding of the development of the occlusion of the teeth in conjunction with their exfoliation and eruption, we must consider that occlusion is a working agreement between the maxillary family above, and the mandibular family below. They are forced to work together, and, with the assistance of their "Uncle Joint," they try to do the best job possible, at times under very difficult circumstances.

The orthodontist has this malleable structure to work with, and when he is fortunate enough to have the happy combination of the cooperation of a healthy patient and a correct concept of the true nature of the anomaly, all he needs for a complete success is an understanding of the normal for that individual and the ability to eliminate the obstructions to normal function by means of his orthodontic technique. The othodontist's success will be tremendously enhanced by using the articulator that Nature put on every one of his cases. Study the mandibular movements as the treatment proceeds. By working with the mandibular joint, seeking its cooperation, the orthodontist will find arch form, cuspal function, and intermaxillary relation revealed as simple factors.

Fig. 5.—An orthodontic correction which appears to be satisfactory when the teeth are in normal rest position, or centric occlusion.

Fig. 6.—View of full lateral function of the same case shown in Fig. 5. The cuspids interfere with one another, and prevent occlusion of the remaining posterior teeth when the mandible is in this position. Reshaping of these cuspids with the grinding wheel is indicated to prevent a collapse in the lower cuspid-to-cuspid area, or a relapse to the original distal displacement of the mandible, or both.

Now we get to an important point—permanence of the result. If I were to choose any one factor as the most important one contributing to successful retention, I believe I would unhesitatingly choose "the establishing of the very best functional occlusion the case will afford." And in answering what I thought constituted the most important single factor in that goal, I would suggest that the classic cuspal relation during function of upper and lower first molars, was secondary to the proper cuspal relation during function of

Fig. 7.

Fig. 8.

Figs. 7 and 8.—A case which appeared to be satisfactory at conclusion of treatment, but failed as a result of interference of the cuspids in function.

the upper and lower cuspids. Here is your goal: Get that lower cuspid to travel in its lateral swing mesial to the upper; not end to end, nor halfway. Make it mesial if you have to reshape the tooth, if you have to leave spaces between maxillary lateral incisor and cuspid, and even if you have to reshape the occlusal surfaces of the molars to adapt them to the cuspid occlusion. (Note: Rotating molars during treatment aids here considerably.) Why so much fuss over cuspids? For one thing, the mandible, when released from its prison (retainer), will try to save the cuspids from the trauma of the severe interference experienced in lateral bite. It will seek an easier path. Obviously, this will be to the distal of the upper cuspid. Then, the mandible will start slipping, and soon you will be back where you started.

And another reason the cuspid must be placed in optimum function is that 95 per cent of the failures in the lower cuspid-to-cuspid region are caused by the interference of this upper and lower cuspid in lateral bite. I invite proof to the contrary, wisdom teeth notwithstanding. Now inasmuch as good dental function is absolutely dependent on optimum intermaxillary relation, and cuspid interference is Enemy No. 1 to normal intermaxillary relation, I believe it logical to place cuspid interference high on the list of the enemies of the orthodontist.

In conclusion: Use the lateral dimensions presented by the mandibular structures as the standards around which to build your cases. Never forget that optimum function is the supreme requisite for retention and favorable development in the future. Consider the vital role environment plays in the growth and development of all the dental structures, including the tempormandibular joint. Use the articulator on every case: that perfect articulator Nature puts on every case for you. And lastly: Employ to its fullest extent the cuspid lock and the cuspid guide.

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Max E. Ernst, Secretary, American Association of Orthodontists, 1250 Lowry Medical Arts Bldg., St. Paul, Minn.

In Memoriam

OREN H. McCARTY

The host of friends of Dr. Oren McCarty will be saddened to learn of his sudden illness and death, March 8, 1944, soon after the close of the annual meeting of the Southwestern Society of Orthodontists at Shreveport. Born in Chillicothe, Missouri, June 4, 1881, his parents moved to western Kansas when he was 3 years of age, and into western Oklahoma some nine years later. He graduated from Western Dental College of Kansas City, in 1905, engaging in the general practice of dentistry in Enid and Collinsville, Oklahoma, until 1915, when he became located in Tulsa, limiting his practice to orthodontics. Dr. McCarty served as President of the Southwestern Society of Orthodontists in 1928, and President of the Oklahoma State Dental Society in 1931. He was a most active worker in organized dentistry during his entire professional life, being a member of his local, district, and state dental societies, of the American Dental Association, the American Association of Orthodontists, and a charter member of the Southwestern Society of Orthodontists, which is the second oldest district orthodontic society, now a component of the American Association of Orthodontists. He graduated from the Dewey School of Orthodontia in 1915, and received postgraduate work at Columbia University with Dr. Mershon and Dr. Oliver. In addition, he had studied with a number of other leaders in the practice of orthodontics.

Dr. McCarty married Myrtle Marie Layman, of Upper Sandusky, Ohio, in 1911. He is survived by his widow and his brother, Dr. Ira McCarty of Tulsa. Even though handicapped by illness in recent years and by a severe accident several years ago, he continued, as always, to labor for the advancement of dentistry and better public health, serving as President of the Tulsa County Public Health Association, and, for a number of years, as a director of "Boys' Home" in Tulsa. His hobbies were fishing, hunting, horseback riding, and farming for recreation. Oren was blessed with a pleasing, genial personality, a love for his many friends and his profession. With almost thirty years in the practice of orthodontics, he has always followed a high standard of ethics, has been studious, always seeking to progress while serving with credit to himself and his profession, always secure in the appreciation of his patients.

But Friendship is a nobler thing—
Of Friendship it is good to sing,
For truly when a man shall end
He lives in memory of his Friends.

P. G. S.

Department of Orthodontic Abstracts and Reviews

Edited by

Dr. J. A. Salzmann, New York City

All communications concerning further information about abstracted material and the acceptance of articles or books for consideration in this department should be addressed to Dr. J. A. Salzmann, 654 Madison Avenue, New York City

Major Factors Influencing Changes in the Human Dentition: By Samuel Rabkin, D.D.S., Cincinnati, Ohio, *Cincinnati J. Med.* **24**: 235, August, 1943.

Tooth decay, disorders of the alveolar bone supporting the teeth, and deformities of the jaws, are constantly on the increase. Dentofacial deformities and malocclusion, which are rampant today, were rare during prehistoric time.

The value of nutrition and mouth hygiene are beyond question. Nor can one question the need of proper prophylaxis. However, imagine the surprise of the clinician who discovers a well-preserved set of teeth in an elderly patient who has eaten indiscriminately all his life and has been quite without benefit of either toothbrush or dentist. The disappointment expressed by the modern mother when neither she nor her offspring have benefited by her prenatal and postnatal precautions may be understood, but the fact is not surprising.

Primarily, it is well to remember that predisposition or resistance to tooth decay is predetermined during the formation of the first body cell. Incidental and secondary local damage to the teeth may occur, however, during any period of the life span of the individual. That which has been said of the teeth themselves is true also of their support, the alveolar bone.

The extreme differences in dental conditions as they exist in civilized man bear witness that the human dentition has been in a state of flux, structurally and morphologically, for a long time. The potentialities for transmissibility of the structure and pattern of the human dentition are the result of long-continued alterations since prehistoric time. Among prehistoric skeletal remains it is often possible to find opposing jaws that approximate articulation even though they belong to separate phylogenetic types. Perhaps not so surprising an occurrence among the most archaic man is the instance where the maxilla of the "Rhodesian man" closely approximates articulation with the Heidelberg mandible.

Radical departures from existent constancy and uniformity doubtless began to develop with the beginning of tribal diffusion and admixture of contrasting phylogenetic types. Conspicuous evidence of such alterations is found among the skeletal remains of early historic peoples irrespective of geographic source. Morphologic changes in the shape, size, and pattern of the teeth, as well as variations in the relationships of the opposing jaws became more manifest. Essentially, they are to be attributed to blending of contrasting types, frequent changes of environment, and changes in food habits and functional uses of the

teeth. Constancy and primordial characteristics persisted, however, among indigenous groups, wherever they remained for lasting duration within the original environment and free from racial differentiation.

The Negro appears to provide the best evidence of the many examples that may be mentioned to indicate the effects of freedom from random mixtures of a people. During the examination of American Negro skeletal material from two separate sources, attention was centered on the similarity of the dental features among many of the skulls. Especially significant were five skulls of one group, in which the opposing jaws interarticulated with one another. This, it can be stated with certainty, is unlikely to occur among the remains of a mixed European group.

In addition to inherent traits of structural diversities that result from crossing of contrasting types, modifications also continue to occur through functional development of an organ. The significance of functional use and disuse of an organ may be ascertained from the contrasting features in the human jaws possessed by primitive and modern man. Such conditions are observable in succeeding generations of the same peoples as long as functions are not interrupted or discarded. The overdeveloped mandibles of the Eskimo (''functional hyperostosis''), which are also often found among some of the remains of prehistoric American Indians, are doubtless due to vigorous use. The continuance of such characteristics from generation to generation persisted or was lost because of adherence or nonadherence to the established, highly developed use of the organ.

A highly developed thickening of the bone in the region where the muscles of mastication are subjected to strenuous tasks is not to be confused with primordial large size of heads and jaws. By comparison, the jaws of the Eskimos, even when large and sturdy, are not larger than the massive jaws of early dynastic Egyptians, or than the jaws of the American Negro, which are often excessively thick and dense but have the bone uniformly distributed. Hyperostosis is seldom seen among the mandibles of the Negro. The effects of vigorous chewing of food are evidenced in a well-developed masticatory system among the Eskimos, Russian Tatars, and American Indians.

The prehistoric American Indian is generally known to have possessed characteristics which were not common among other earlier groups from Africa or Eurasia, and serves as an appropriate example for this discussion. While these characteristics were not always present among the pre-Columbian American Indians, nevertheless they were known not to have existed among other primitives. These distinct aberrant features consist of large ''shovel-shaped'' (Hrdlička) maxillary first incisors. The second incisors are much larger than their usual size; the contacting teeth are flat-surfaced instead of having the universally prevailing tangent contact to adjacent teeth, and are firmly pressed against one another. More unusual is the formation of the enamel of the incisors. These have raised marginal ridges on either side of the labial surface extending from the gingiva to the incisal edge. Thus, the entire front surface is scooped out instead of having the rounded convex shape that predominated among other primitive and modern men. Occasionally, some distinctly contrasting features are observed among the prehistoric Indian teeth. These consist

of very large posterior teeth and have highly rounded contacting walls of the crowns, bulging at the center, instead of having tapering and pointed contacting surfaces.

A more curious phenomenon that occurred among these Indians was torsion, or anterior vergence, of the maxillary first incisors. The frequency of this trait becomes more impressive as one continues to examine skeletal remains. The striking abnormality, whatever its cause, consists of the turning of the upper incisors so that they are depressed in the midline, forming a troughlike shape. Accommodation to articulate with the lower teeth has similarly developed to provide for biting stress when the jaws are closed. This anomalous condition obviously is not due to shifting of the teeth during old age as is often believed. Finding the same condition in the skulls of children among a collection of early Kentucky Indians (The Indian Knoll Collection) helped to remove all traces of doubt that the various dental modifications and aberrations described are typical characteristics common to one people. Although these features were not present among all pre-Columbian Indians, they nevertheless are frequently found among the very early Indian remains from various parts of North America, and perhaps elsewhere.

Territorial transplantations, and changes in environment and food habits, are factors which may be associated with noticeable changes in dental complement even among primitive groups. However, none approached the radical departures from constancy and the increase in continuous transformations as they exist in modern man. Far from undergoing a total metamorphosis, even though greatly affected by various adverse influences associated with modern civilization, the dentition today consists of a complex combination of the past and present. The resultant complex, or the original and the radically altered, did not occur spontaneously. The change occurred as gradual transitory oscillations, but with ever-increasing tendency toward a blend of newly acquired transmixture. The dentition of modern man is, therefore, the result of extreme hybridization.

That the dentition of modern man also reveals the ill-borne effects of a trying ordeal as the result of a colossal conflict between nature and civilization cannot be questioned. However, the influences of genetics and heredity, which accounted for widespread diversities, also continued reintroduction of primordial types.

In addition to various physical modifications and inheritance of diversities, the jaws and teeth of civilized man have also developed many structural and chemical defects. These defects appear recurrently with increasing, newly acquired deficiencies. Hereditary dissimilarities, however, are the source for the continuation of diverse features in both the ideal and the defective as they prevail in modern man.

Evidence governing sex-linked dominant inheritance, including the tendency toward parallelism and crisscrossing, are frequently observed clinically. One example is that in which the teeth of a boy were typical of those of his mother, while his sister inherited the oddly shaped (yellow and pitted enamel) teeth of the father and his two sisters. These inherited distinct characteristics not only followed the morphologic pattern of the teeth on either parental side, but also with respect to the opposition of the jaws and articulation of the teeth. The

frequently observed wide diastema between the upper first incisors (sometimes between canine and second incisors) is a characteristic rarely seen in the remains of prehistoric types. One example that came to the writer's notice shows the continuation of such a cleft from grandmother, through mother, to daughter.

Many other contrasting traits, aberrations, and deformities, that have developed continually since ancestral time, are departures from uniformity in configuration of the shape of the jaws. Unlike the preponderance of uniformity of the palates and jaws of primitive man, distortions, protrusions, and malocclusion are very common today. The deformities occurring in modern man as a result of malocclusion are not to be confused with prominent overbite occasionally seen among remains of prehistoric and primitive man.

Doubtless resulting from continued blending and random mating, is the striking example of megalodontia (teeth too large for the jaw), or the opposite—wide spaces occurring between most of the teeth, indicating too spacious a jaw for the teeth.

Equally as curious a phenomenon is the occurrence of oddly shaped and irregularly spaced teeth, as though coming from one mold. For example, these are possessed by a brother and three of his four sisters. The brother and one sister only are married, and the filial inheritance of their marriages are as follows: The first son of the brother inherited the dentition of his father, while the second paralleled the typical pattern of his mother. In every instance, the teeth of brother and sisters are undersized for the spacious jaws. The canines lack the usual tapering ends. The maxillary first incisors are close together, but the remaining teeth are widely separated and irregularly arranged. Having reached an advanced stage of life, it is found that their teeth are relatively free from caries, but are markedly predisposed to pyorrhea. A further change occurred when the only son of the married sister inherited most of the characteristics of his father.

In another family, the mother possesses an excellent complement of teeth, invested in firm, healthy jawbone. The teeth are of the long pattern, having a yellow tinge. Already in her fifth decade, her teeth, so far, have required little dental attention. An existent anomaly consists of congenital absence of both maxillary, and one mandibular, second premolars. The father's teeth are short, pearly-gray in color, badly decayed, and with pitted enamel, and required dental attention from early childhood, with no congenital missing teeth. One of their sons, aged 14 years, had one maxillary and one mandibular second premolar congenitally missing. The pattern of his teeth, including their health status, approximates in many respects the mother's side. Their second son, aged 12 years, in addition to lacking both maxillary second premolars, possesses the teeth and jaws typical of his mother.

The predisposing tendency toward dental disease through transmission among modern man is significant. The popular reference, as "taking after mother" when one's teeth are severely attacked by decay, or "father had it" indicating the untimely loss of sound teeth due to faulty bone formation, bears witness to a general belief in the transmission of an inherent defect. However, the process is sometimes reversed, as witnessed in the following instance. A man who lost a second tooth at the age of 87 years otherwise presented an example of most perfect teeth and jawbone, rarely seen in modern populations.

His son, like the mother, required artificial teeth before the age of 50 years, while an older daughter continues the pattern of her father's teeth.

The examination of anatomic material showing the development and growth of the human skeletal frame during embryonic and fetal periods (as disclosed in cleared specimens) already reveals distinct contrasting features in the formation, structure, and configuration of the respective jaws. Likewise, the shape and size, as well as normal or abnormal opposition of the upper and lower jaws, are already discernible in such prepared specimens even during the early stage of fetal development. With respect to the predisposition toward degenerative changes during the life of the individual, little is known so far except what is revealed through clinical evidence. Clinical observations prove conclusively that the tendency toward health or disease, save for change in the physiology during early youth, is hereditarily predetermined and cannot be changed at will, later in life.

Considering the divergent views that exist regarding the causes for prevailing tooth deterioration, it is safe to say that clinical experiences should preclude an abstract interpretation for the various types of tooth destruction as they occur in different individuals; they do not fit into one single category of "caries." In most instances the predisposition towards tooth deterioration has been cumulatively acquired, especially since the advance of civilization. The predisposition as well as the inherently established alterations, have become transmissible traits which continued with each new generation. Although, through the forces of genetics and heredity, many diverse changes often follow.

The question of proper food habits and the importance of adequate nutrition cannot be overemphasized. Foods and fads, however, are not synonymous. Little is to be gained by feeding a child supplementary restoratives after the full formation of the crowns and eruption of the teeth. Moreover, such measures as prenatal care must begin many generations before birth. As for an adequate diet that will provide the necessary mineral elements for sound teeth and bones, that can only be had when all sources of food supply contain such elements in abundance.

Two Cases of Spontaneous Dislocation of the Mandible During Yawning: By C. V. Berry, *South African Dental Journal* **17**: 343-345, November, 1943.

Both patients reported that dislocation occurred spontaneously while yawning. Case 1 had been unreduced for six weeks. Case 2 occurred three weeks previously. Neither complained of pain, but of discomfort and deformity with inability to chew.

CASE 1.—A native male about 35 years of age, healthy and well-developed. His face was unusually long and oval. The angle of the mandible was very oblique, as is often found in these spontaneous cases. The lower jaw protruded considerably, and the teeth were widely separated, rather uniformly, back and front. The mandible could not be moved voluntarily or even with considerable force, and the lips could be made to meet with difficulty. Speech was difficult, but there was no excessive salivation.

CASE 2.—A native female about 25 years of age, obviously healthy and well-nourished. She, too, had an unusually long and oval face for a native, and similarly the angle was very oblique. There was a very distinct difference in the relationship of teeth of the two jaws: the anteriors were widely parted, but the end molars were in hard contact with the mucous membrane of the end of the vestibule forced between them. This was badly lacerated and immovably incarcerated. The jaw could not be moved by considerable force. There was no lateral deviation in either case indicating a bilateral dislocation.

Treatment.—The histories indicated that they were difficult cases, as did also the radiographs; therefore, the patients were anesthetized. The method of reduction which the writer has found most effective in these difficult cases is for the operator to stand at the head of the operating table with the patient's head pulled up against the epigastrium; the thumbs are then inserted into the buccal sulcus, the left into the left and the right into the right, with the dorsal aspect of the hands looking forward. The fingers are passed along the body of the mandible outside the mouth—the thumbs must pass as far back as possible—and force is exerted by the intrinsic muscles of the thumb, while an effort is made to pronate the hand; this forces the thumb powerfully downward. This position is held until the muscles are felt to yield slightly, when the palmar surface of the proximal end of the metacarpus of the index finger is turned up forcibly against the chin, simultaneously pulling the head up against the epigastrium of the operator. The thumb must be used as a fulcrum in this movement, and suddenly the condyle will slip downward and backward into the fossa. At this juncture, the thumbs slip quickly from the vestibule, and the hand is quickly supinated into the position to pull the chin upward and backward. It thus appears that one were holding out the hands as does a little child to catch a ball, or as does a native to receive a gift. There is absolutely no risk of injuring one's fingers, and the method has proved effective when all other methods have failed.

Postoperative.—A piece of rubber dam, 3 by 6, is stitched between the ends of a 3-inch bandage. The rubber is placed under the chin and the bandage tied over the vertex with moderate tension. This should be retained for two or three weeks at least. It is removed only for washing of the patient or for replacement. The teeth may be wired to permit a limited separation of the jaws, or elastic bands may be used similarly. The patient is instructed about the possibility of recurrence, and the object of the above treatment.

Conclusion.—In very difficult cases as the above, there is a danger with strong men, when frustrated, of converting the reductive movement, in the anterior position, into an anterior pull, which will simply end in failure and a worsening of the displacement. The method suggested above will prove much more effective, and of course can be used equally well without an anesthetic, on an ordinary table or in the dental chair in the horizontal position.

News and Notes

Southwestern Society of Orthodontists

The Southwestern Society of Orthodontists held their annual meeting at Shreveport, Louisiana, February 28 to March 2, 1944.

Notwithstanding the present difficulties of transportation, sixty or more members and guests were in attendance. Even though sixteen of our members are now in the Service, this was an excellent high attendance considering the extent of territory included in this Sectional Society. Members and guests were present from rather distant points, i.e., El Paso, Texas, New Orleans, La., Denver, Colo., and Kansas City, Mo.

The first day, Monday, was devoted to the routine business of the Society, with an all-day session of the Board of Directors. Other members and guests enjoyed an afternoon of golf at the Shreveport Country Club, which was followed by a cocktail party at 6:00 P.M., and a quail and duck dinner at 7:00 P.M., with about forty members of the Fourth District Dental Society as guests of the Southwestern Society. Dr. Guy Gillespie served efficiently as toastmaster. With the aid of plenty of good food together with the fine spirit of fellowship and hospitality of the Shreveport Dental Society, a fine time was enjoyed by all.

On Tuesday, after presentation of President Harper's address, and the welcoming address by Dr. H. J. Siess, President of the Fourth District Society, the entire day was allotted to Dr. C. H. Tweed, of Tucson, Arizona, our guest essayist, and to clinics designed to cover the methods of treatment advocated by the essayist. The closing hour was devoted to a general discussion of the theories and techniques which had been presented.

On Wednesday morning, Dr. Clarence Webb, of Shreveport, presented a very interesting paper on "Dental Abnormalities as Found in the American Indian" with discussion by Dr. W. E. Flesher, of Oklahoma City. A case report was given by Dr. Dan Peavy of San Antonio, with discussion by Dr. J. S. Cunningham of Houston. A business session followed, presenting all committee reports, including a report from the Secretary Treasurer. It is noteworthy that the Society is on a good financial basis with all extra funds invested in War Bonds. A luncheon at 1:00 P.M. in the Zephyr Room of the Washington-Youree Hotel as guests of Fourth District Dental Society was one of the most enjoyable events of the entire meeting, for which the members of the Southwestern Society are most appreciative. Wednesday afternoon was devoted to table clinics of which about twenty were presented. All were good, helpful, and of interest to the entire membership. The period of general clinics is always worth while. This period provides an opportunity for a frank, informal discussion of many of our daily problems.

The Thursday morning session was devoted to a "Symposium on the Business Side of Orthodontics," with papers by Dr. Nat Gaston of Monroe, La., Dr. Clarence Koch of Little Rock, and Dr. Harry Sorrells of Oklahoma City. Discussion followed by Dr. Guy Gillespie, Dr. O. H. McCarty, and Dr. W. B. Stevenson. A case report (colored movie) was given by Dr. S. H. Johnson of Austin, with discussion by Dr. J. C. Williams of Fort Worth. At a final business session, the following officers were elected and installed:

Dr. Harry Sorrels, Oklahoma City, Okla., President;
Dr. Brooks Bell, Dallas, Texas, President-Elect;
Dr. J. B. McGinnis, Beaumont, Texas, Vice-President;
Dr. J. O. Bailey, Wichita Falls, Texas, Secretary-Treasurer.

Dr. W. T. Chapman was re-elected as our delegate to the Board of Directors of the American Association of Orthodontists, and Dr. J. C. Williams was elected to a three-year term on the Board of Censors.

Oklahoma City was selected as the city for the next annual meeting. Before final adjournment, it was unanimously agreed that the Society had enjoyed one of its best

annual sessions, and all were appreciative of the efforts of all committees, of the fine cooperation of local members, and of the generous hospitality of the local dental society. Dr. Hamilton D. Harper, our immediate Past-President, may be assured that, even though he has served during a most difficult period, he provided one of our best annual meetings and enjoyed a most successful administration.

Excusing School Children for Dental Appointments

Of interest to professional men everywhere who have to do with the physical welfare of children of school age is the fact that the Kansas City, Missouri, School Handbook contains the following notice:

"Authorization of the cooperation of building principals in the matter of excusing pupils for necessary dental work during the school day, when requested by the dentist and by one of the parents, through the utilization of the dental excuse blank, was granted by the Board of Education last year and will be continued again during the 1943-1944 school year. Cooperation of all members of the dental society in keeping the number of pupils for whom dismissal is requested to a minimum has been assured, while, if the hour designated for excusing is not acceptable to the pupil's schedule, the time may be altered by calling the dentist. This procedure is in the interest of pupil health and is made necessary by the war emergency."

EXCUSE FORM FOR DENTAL APPOINTMENT

Approved by Public School Authorities of Kansas City, Missouri

Name of Pupil----------

has an appointment for necessary dental service on

Date of Appointment----------19----

Time of Appointment----------.

This service cannot be satisfactorily rendered outside of school hours.

----------D.D.S.

This appointment was arranged with my knowledge and approval.

Signature of parent

The excuse form shown above, used judiciously, enables the Kansas City, Mo., children to obtain necessary dental service that cannot be satisfactorily rendered outside of school hours.

Blood Plasma Used in Dental Cases

So much has been said about the use of blood plasma in medical cases that its use in saving lives of dental patients has been largely overlooked. Yet, according to no less authority than Major General Robert H. Mills, chief of the Dental Division, Medical Department, U. S. Army, in many serious cases involving maxillofacial injuries, it has been found necessary to use plasma to save lives.

Major General Mills has just returned from an inspection tour of the European and North African theaters of operations. While in those areas he had many occasions to see the miraculous effects of plasma transfusions.

"In many of the serious and extensive maxillofacial injuries which involve the face and jaw structure, the medical and dental officers find it necessary to use blood plasma to save lives," he said.

"In any of these head injuries where there is considerable loss of tissue and consequently considerable loss of blood, the need for blood plasma is frequent. There have been an appreciable number of cases brought before Dental Corps officers where blood plasma was needed."

There are at present 35 Red Cross blood donor centers participating in the program of providing plasma for the Army and Navy. The Red Cross has been requested to furnish 5,000,000 donations in 1944.

H. R. 4216, A Bill

TO PROVIDE MORE EFFICIENT DENTAL CARE FOR THE PERSONNEL OF THE UNITED STATES NAVY

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That (1) the Secretary of the Navy be authorized and directed, no later than sixty days after this Act becomes law, to establish a Dental Department in the Navy, which shall function under the Surgeon General as is now provided in the case of the Medical Department.

(2) To provide that the functions of the Dental Department shall be of such professional, technical, and administrative nature as pertain to the conduct of the naval dental service, including cooperation with the Medical Department in all matters of mutual interest and cognizance.

(3) To provide that personnel of the Dental Department shall consist of (a) officers of the Dental Corps, one of whom shall serve as Director of Dentistry and be directly responsible to the Surgeon General for the administration of dental affairs within the Bureau of Medicine and Surgery; (b) chief warrant and warrant officers in numbers not exceeding 5 per centum of the total number of officers of the Dental Corps; (c) enlisted personnel in such ratings and distribution by pay grades within the ratings and in such numbers not to exceed 166 per centum of the total number of dental officers, as may be prescribed by the Secretary of the Navy: *Provided further,* That nothing stated herein shall act to reduce the grade or rank of any person.

(4) To provide that the Director of Dentistry shall be appointed by the President from dental officers on active duty and that the Director of Dentistry shall, while so serving, have the rank of Rear Admiral.

(5) This Act to take effect immediately upon its approval by the President.

Engineers Improve First-Class Dental Material

HEADQUARTERS, EUROPEAN THEATER OF OPERATIONS: Being a dentist for an Engineer Regiment has its advantages in the opinion of Captain Alex Grower, 35, 267 Main Street, Portland, Connecticut, now in England. The engineers make dental instruments and equipment otherwise unobtainable.

"Sometimes equipment is slow in arriving overseas," said Capt. Grower, "but we never worry about that. So far the engineers have built or created everything I've asked for, and done a mighty good job."

He listed a Hydrocolloid mixing syringe, chisels, curettes, adaptors for lights, electric motors for drills, and parts for hand pieces as items made to order for him by some of the men.

"I usually draw a diagram of what I want or show the men a picture of the instrument or equipment in the dental journal," he disclosed, "and they use whatever materials they have on hand to turn it out."

Members of the regiment who have adapted their skill to manufacturing dental equipment are Corp. Ralph E. Weimer, 31, Girard, Ohio; Corp. Charles E. McBride, Jr., 27, 821 W. 9th Street, East Liverpool, Ohio, and Pfc. Paul Burt, 21, Route 1, Belle, Missouri.

Notice

Will all Massachusetts Alpha Omegans in the Service, both in this country and abroad, please communicate with:

Dr. Abraham Gurvitz,
War Service Committee,
Alpha Omega Fraternity,
371 Commonwealth Avenue,
Boston 15, Massachusetts.

New York Society of Orthodontists

The fall meeting of the New York Society of Orthodontists will be held at the Waldorf-Astoria Hotel, New York City, on Monday and Tuesday, Nov. 13 and 14, 1944.

Note of Interest

Dr. W. Wayne White announces the removal of his office to 6333 Brookside Plaza, Kansas City, Missouri. Dr. Elizabeth E. Hulse, Associate. Practice limited to orthodontics.

"A Smile for the Day"

Under the head of "a smile for the day" is received the following from an eastern seaboard orthodontist, which reveals that the public relations committee of the American Association of Orthodontists still has education work to do.

A prospective new patient telephoned the office for an appointment, and to make sure that she had the right party on the phone she inquired, "Is this the office of the doctor who makes bracelets on teeth?"

OFFICERS OF ORTHODONTIC SOCIETIES*

American Association of Orthodontists

President, J. A. Burrill - - - - - - - - - - 25 East Washington St., Chicago, Ill.
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Public Relations Bureau Director, Dwight Anderson - 292 Madison Ave., New York, N. Y.

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Southwestern Society of Orthodontists

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Claude R. Wood - - - - - - - - - - - Medical Arts Bldg., Knoxville, Tenn.

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President, Max Abrams - - - - - - - - - - - - - 184 Shirley Ave., Revere, Mass.
Secretary-Treasurer, Edward I. Silver - - - - - - - - 80 Boylston St., Boston, Mass.

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*The Journal will make changes or additions to the above list when notified by the secretary-treasurer of the various societies. In the event societies desire more complete publication of the names of officers, this will be done upon receipt of the names from the secretary-treasurer.

Washington-Baltimore Society of Orthodontists

President, Stephen C. Hopkins - - - - - - - - - 1726 Eye St., Washington, D. C.
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Secretary, R. Cutler - - - - - - - - - 8 Lower Sloane St., London, S.W. 1, England
Treasurer, Harold Chapman - - - - - 6 Upper Wimpole St., London, W. 1, England

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Secretary, Rafael Huneeus - - - - - - - - - - - - - - - Calle Agustinas 1572
Treasurer, Pedro Gandulfo - - - - - - - - - - - - - - - - Calle Londres 63

Sociedad Argentina de Ortodoncia

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Secretary, Miguel A. Finocchietti
Secretary-Administrator, Edmundo G. Locci

*The Journal will publish the names of the president and secretary-treasurer of foreign orthodontic societies if the information is sent direct to the editor, 8022 Forsythe, St. Louis 5, Mo., U. S. A.

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